VOLUME 31 AUGUST 1938 NUMBER 8

Southern Medical Journal

Journal of the Southern Medical Association

Copyright, Southern Medical Association, 1938. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

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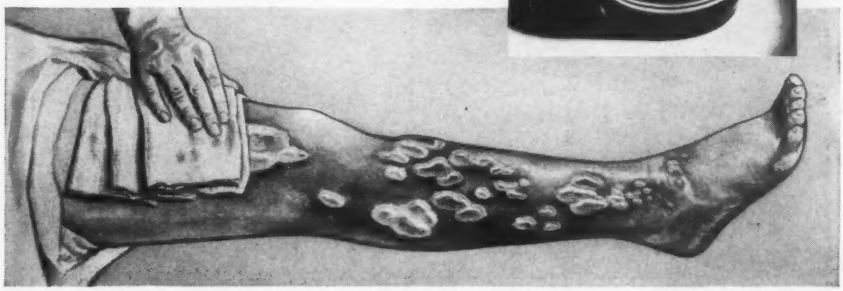

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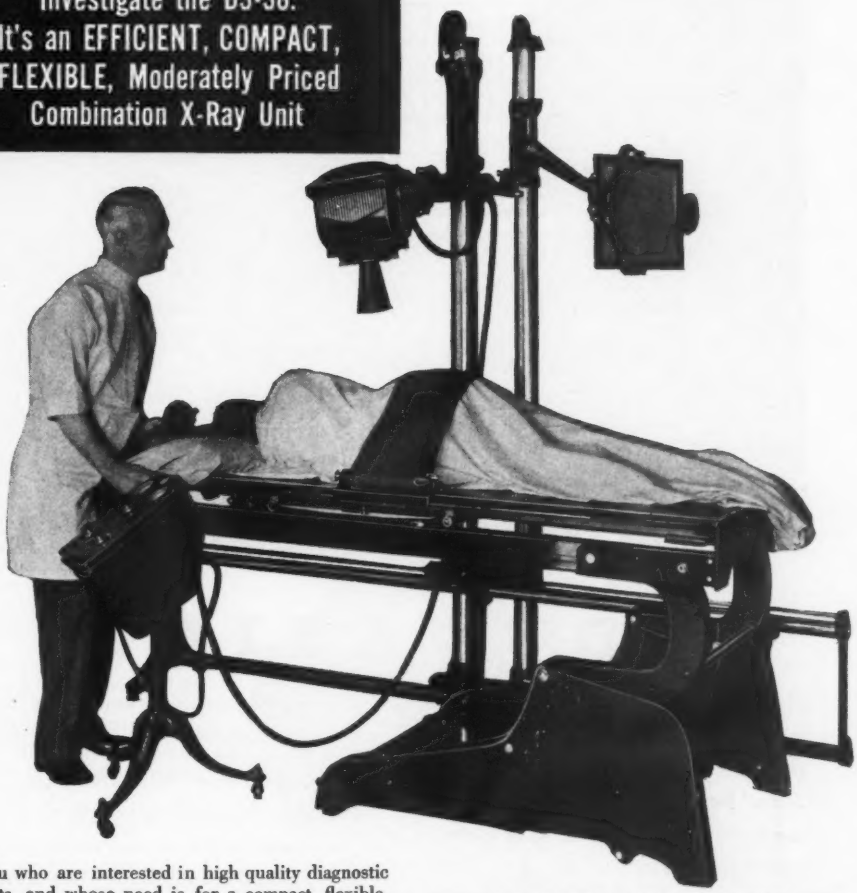

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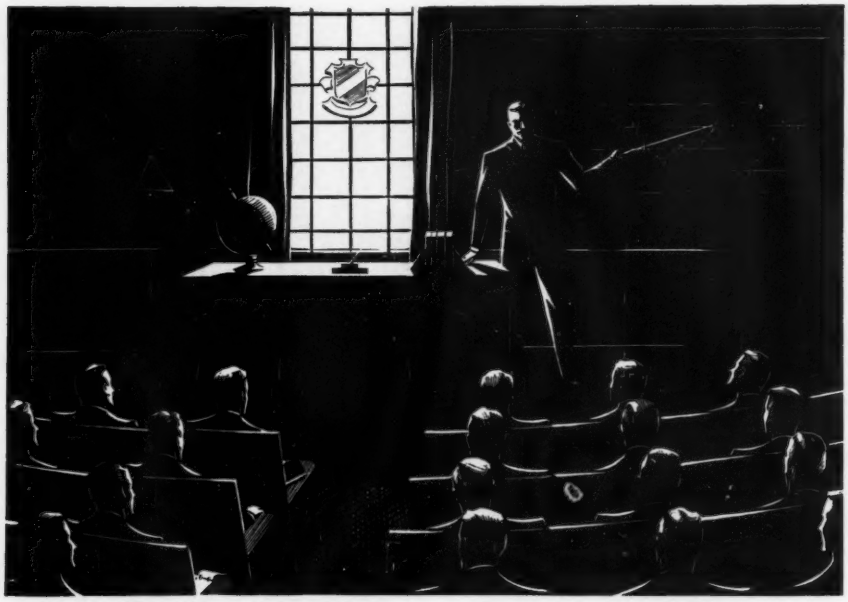

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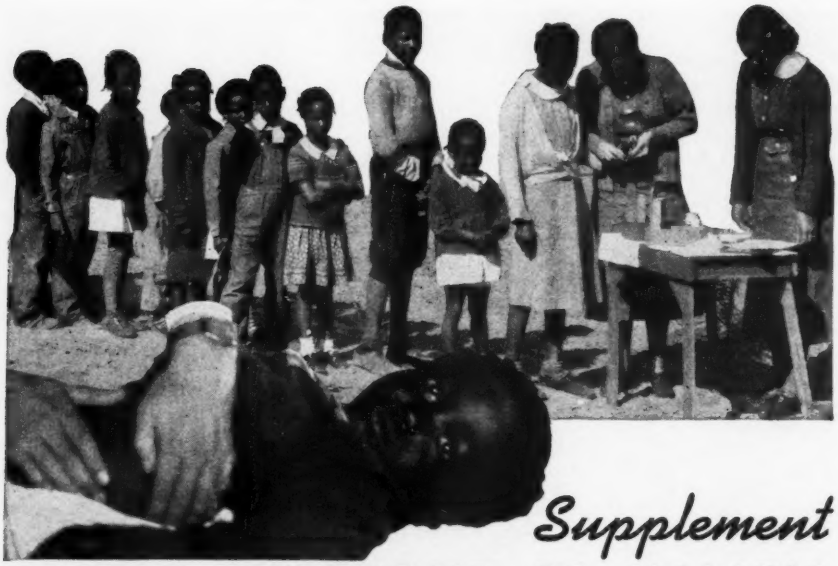

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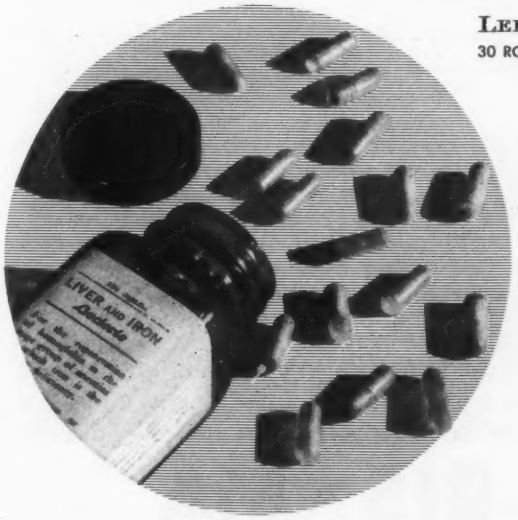

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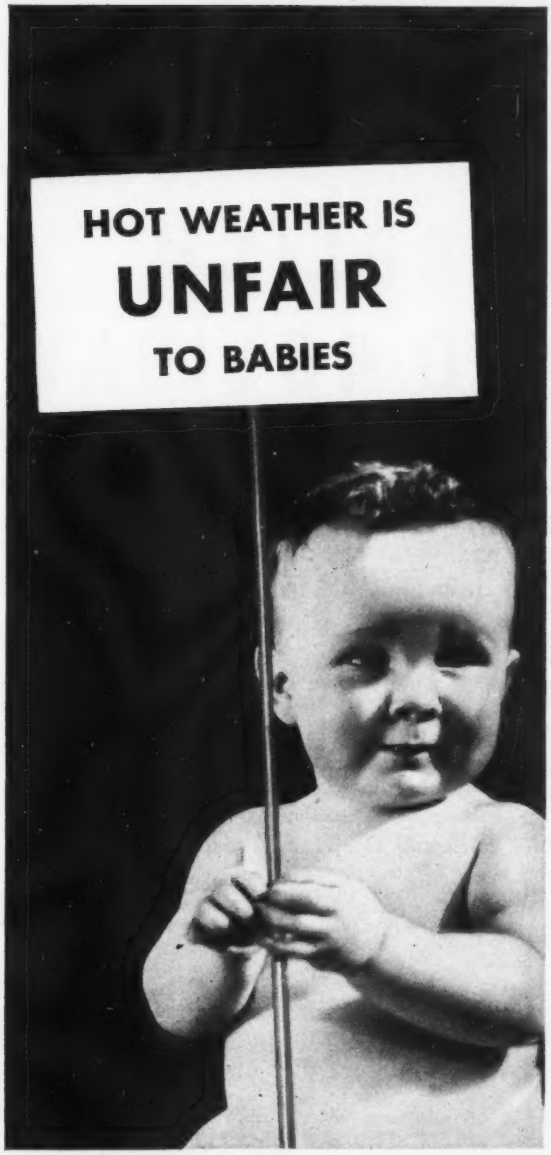

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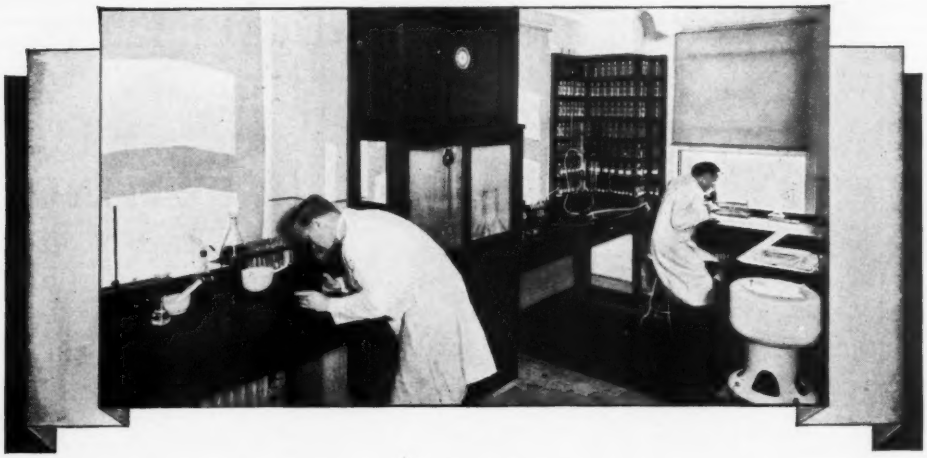

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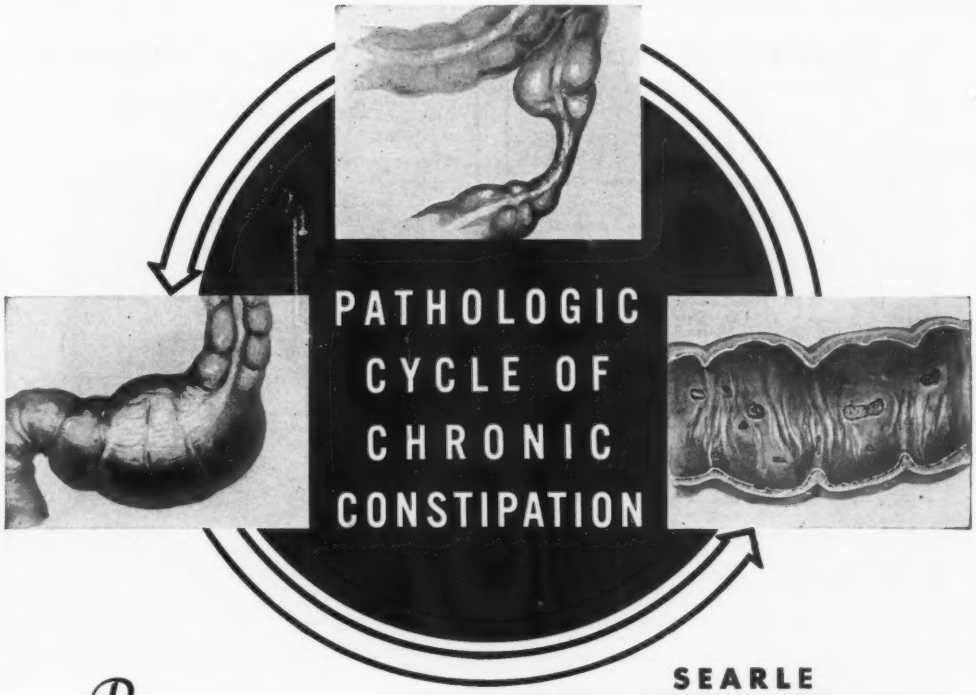

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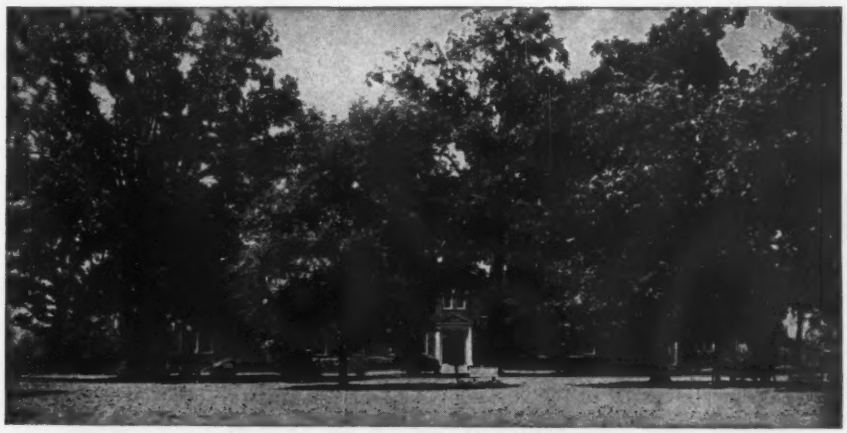

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Volume 31 AUGUST 1938 Number 8

RADIATION THERAPY OF PRIMARY HEMANGIOMA OF THE VERTEBRAE*

By IRA H. LOCKWOOD, M.D.
and
CHARLES E. BELL, M.D.
Kansas City, Missouri

Primary hemangioma of the vertebrae has rarely been observed clinically; however, there is evidence in the literature of a growing interest in the disease. With the widespread use of radiographic methods, it should become more common.

The first case was reported by Virchow[50] in 1864, and scattered cases were observed at necropsy until the work of Gold[15] and of Perman[40] in 1926. Gold published a case which was operated upon and died. He removed the diseased vertebra and made radiographs of the sectioned bone. This laid the groundwork for the criterion of the future diagnostic findings. Perman's case represents the first radiographs of a vertebral hemangioma made in the living subject and the first case successfully operated upon.

The disease was not recognized clinically until the published reports of Bucy, Capp and Bailey[3-6] in 1929. They were able to find in the literature from 1864 to 1929 only twelve cases of hemangioma occurring in the vertebrae. We have collected twenty-eight additional cases which have been published from 1929 to 1937. This makes the total of previously reported cases forty, and we are reporting, here, three new cases. The complete summary of the cases from 1864 to date is given in *Table 1.*

Extensive pathological work on hemangioma of the vertebrae has been done in Schmorl's Institute.[11] In 1927 they reported finding the lesion in 10.07 per cent of the vertebral columns examined. Struck by the relatively frequent occurrence, Topfer[48] (1928) in Schmorl's laboratory, sectioned, sagitally, 2,154 vertebral columns and found the lesion in 257 bodies, or in 11.93 per cent of the subjects. In 1932, Junghanns, working in the same institute, found hemangiomata in 10.7 per cent of 3,829 spines.[11] These findings are the results of routine sectioning of vertebral bodies and represent the actual presence of the tumors without reference to any clinical symptomatology. Roughly, one may state that in about 10 per cent of all spines there exist hemangiomata. They may be found at any time from birth to death and are more frequent in females. At autopsy 54.1 per cent occurred in females and 45.9 per cent in males.[6] Clinically 62 per cent of the cases have been in females and 38 per cent in males.

The location may be in any of the vertebrae, but they are more often found in the thoracic and lumbar areas. In nine of the cases multiple vertebrae were involved. Rarely is there any gross change in the bone. It may appear somewhat expanded, and only four times has compression of the body been observed (*Table 1,* Cases 10, 16, 17).

According to Bucy,[5]

> "Although these tumors are frequently found to have broken through the cortex of the bone, the periosteum which has become stretched over the surface of the tumor is unbroken."

This overgrowth may extend into the spinal canal and produce pressure on the spinal cord. On sectioning one finds a tumor varying in size from a few millimeters to complete involvement of the body of the vertebra and its processes. They appear as vascular tumors lying between the bony trabeculae. Characteristically one finds a peculiar parallel, vertical striation of the body which is due to the heavy bone trabeculae lying between the areas of vascular tumor (*Fig. 1,* gross cross section). The bony trabecula being

*Read in Section on Radiology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

Table 1

SUMMARY OF ALL REPORTED CASES OF HEMANGIOMA OF THE VERTEBRAE

Author and Year	Sex	Age	Location	Symptoms	Treatment	Results	Remarks
1. Virchow[50] 1864	F	Old	?	****	****	Dead	Also in the liver
2. Gerhardt[13] 1894	M	18	5-6 Th.	Compression myelitis	****	Died 6 years later of erysipelas	Angioma of the spinal canal
3. Deetz[10] 1901	F	42	?	Spastic paraplegia	****	Dead	Also in the liver
4. Muthmann[37] 1903	F	61	6 Th.	Sciatica 16 years Weakness in legs	****	Died other disease	Angioma dura and subpleural
5. Ribbert[43] 1912	F		Th.	Spastic paraplegia	****	Dead	Multiple
6. Trommer[49] 1919	F	17	5-6 Th.	Spastic paraplegia	****	Died in 2 years	Extension into spinal canal
7. Gold[15] 1926	M	23	1-2-6-7 Th.	Weakness legs 5 years. Spastic paraplegia late	Laminectomy	Died of hemorrhage	Angioma of the liver
8. Perman[40] 1926	F	24	8 Th.	Weakness legs 6 years. Spastic paraplegia	Laminectomy and x-ray	Complete recovery	Severe shock and hemorrhage at operation
9. Guillain, Decourt and Bertrand[16] 1928	M	18	7-8-9 Th.	Spastic paraplegia	Laminectomy	Died of hemorrhage	
10. Globus and Doshay[14] 1929	F	13	8 Th.	Spastic paraplegia	Laminectomy	Died of hemorrhage	Collapse of vertebral body
11. Makrycostas[34] 1929	F	75	Three L.	Antemortem caries of fifth lumbar	****	Dead	Intercurrent disease
12. Bucy and Capp[6] 1929	F	62	3-4-5-6 Th.	Spastic paraplegia	Laminectomy and x-ray 1181 r	Recovery	Lipiodal showed spinal block
13. Ramage and Nattrass[39] 1930	M	51	8 Th.	Spastic paraplegia	x-ray	Improvement	
14. Connell and Hay[9] 1930	F	31	6-7 Th.	Spastic paraplegia	Refused	Died 11 years later	Epidural angioma, invaded lamina
15. Reisner[42] 1931	F	51	10 Th.	No symptoms	****	Living	Found in a review of spines, had patient return 2 years later
16. Junghanns[23] 1931	M	62	3 Th.	Pain in mid-back. Spastic paraplegia	Laminectomy	Cure	Compression of the body
17. Sandahl[47] 1931	?	?	12 Th.	Compression fracture	Laminectomy	Improvement	
18. Roith[45] 1931	?	?	7 Th.	?	Laminectomy	Improvement	Operation done with electrocoagulation
19. Jiano, Grigoresco and Vasiliu[22] 1931	M	17	2 Th.	Spastic paraplegia for 9 months	Laminectomy	Died from operation	Lipiodal block at C 7. Had extradural angioma and body involved
20. Ireland[21] 1932	F	25	1 L.	Pain in lumbar and abdominal areas	Radium, 1200 mg. hrs.	Recovery	Also had a gastric ulcer
21. Alpers and Pancoast[1] 1932	F	46	8 Th.	Difficulty in walking for 4 years	Laminectomy	Recovery	X-ray given as prophylactic postoperative
22. Clavelin and Gauthier[8] 1932	M	21	4 Th.	Comp. myelitis	Laminectomy	Death from hemorrhage	Bone very vascular
23. Litten[30] 1932	F	62	2 L.	Pain in gallbladder area	*****	Living	Had gallstones; no indication for treatment
24. Lievre[27] 1932	F	36	1 L.	Pain in lumbar area and sciatic radiation 7 years	X-ray	Recovery	Well 2 years later; vertebral body expanded
25. Arbot[36] 1932	F	37	4 L.	Spastic paraplegia	Refused	******	******
26. Roederer[44] 1933	F	29	5 Th. and 1 L.	Pain following accident	*****	******	******
27. Hammes[17] 1933	F	12	6-7 Th.	Spastic paraplegia	Laminectomy	Recovery	Operative shock
28. Nemour-Auguste[38] 1934	F	54	12 Th.	Heaviness in legs and cramps at night; increased reflexes	X-ray, 2400 r	Improved	No change in x-ray appearance

Table 1—(Continued)

SUMMARY OF ALL REPORTED CASES OF HEMANGIOMA OF THE VERTEBRAE

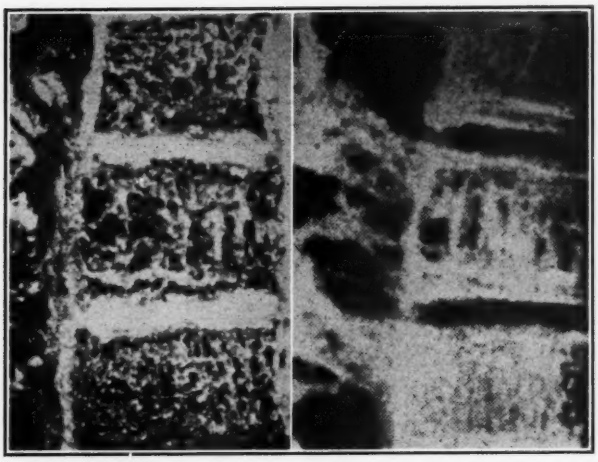
Author and Year	Sex	Age	Location	Symptoms	Treatment	Results	Remarks
29. Lacey and Smith[25] 1934	F	47	9 Th.	Loss power legs 26 yrs. Comp. myelitis	*****	Died 4 months	Autopsy showed compression of cord
30. Fumarola and Enderle[11] 1934	M	25	5 Th.	Pain in legs 1924, diag. Pott's dis., diag. 1930 comp.	Laminectomy	Improved	Seen for 9 years; several x-rays; finally diagnosed
31. Zawadowski and Jarzymski[31] 1934	F	62	3 Th.	Paralysis (comp. my.) 5 months duration	X-ray	Recovery	Lipiodal block descended after x-ray
32. Zawadowski and Jarzymski[31] 1934	F	65	9 Th.	Paralysis of legs two years	X-ray	Recovery	Iodized oil normal
33. Funsett, Sichel and Lewin[12] 1935	M	39	3 L.	Periodic pains in back and one leg since age 11.	To have x-ray	?	?
34. Lupacciolu[22] 1935	?	52	3 L.	Lumbar pain for eight years	******	*******	Soap bubble appearance not typical striation
35. Livingston[21] 1935	M	44	3 L.	Low-back pain	X-ray	?	?
36. Hilton[20] 1936	M	50	Thoracic	Comp. myelitis	Laminectomy X-ray. 3000 r	Recovery	Greatest clinical improvement from x-ray
37. Picot[41] 1936	M	57	3 L.	Gallbladder colic	******	*******	Discovered in gallbladder examination
38. Lamy and Weissman[20] 1936	F	23	1 L.	Pain in back after fall	Corset and radiation	Improved	X-rays for 7 years are alike
39. Zdansky[52] 1936	M	64	4 Th.	Comp. myelitis	******	Died; had comp. of the body	Also comp. of cord
40. Zdansky[52] 1936	M	72	10 Th.	Pain	******	Sclerosing type of tumor	Multiple bone involvement

heavy and vertical, gives good support to the body, and explains the rarity of compression, and also produces the characteristic radiographic findings.

On microscopic section (*Fig. 2*) one sees a vascular tumor which lies between bony spicules. The tumor consists of large cavernous spaces containing blood, and lined by a thin layer of endothelium. The intervascular tissue is loose and rather acellular. The cells are usually spindle-shaped and occasionally stellate. The nuclei are ovoid and contain but a small amount of scattered chromatin. The stroma of connective tissue consists of a loose network of fibers. There are variable amounts of fat cells. The bony trabeculae show two changes, osteoblastic and osteolytic. One sees areas of bone being destroyed by typical osteoclasts and other areas where new bone is being formed. Bucy[5] says:

"Certainly we are dealing with a benign, slowly growing tumor mass that, as a result of its presence and growth, produces a characteristic reaction in bone."

Hemangiomata produce an interesting clinical picture. Most of the cases present a history of a long-standing process with periods of remission and relapse. The symptoms of these lesions are divided into two classes: those with pain and those with a spastic paraplegia. Thirteen, or 27 per cent of the cases, have given a history of pain, and twenty-three, or 63 per cent, have had compression myelitis. The spastic paraplegia progresses slowly from weakness of the lower extremities to complete loss of control of the muscles below the level of the tumor with disturbance of sphincter control of the bladder and rectum. They are diagnosed clinically as a compression myelitis and are undoubtedly due to compression of the cord by either the expanding bone or the tumor process which may have extended into the spinal canal. Some of the cases have little or no motor involvement and present themselves with a history of pain in the back that may radiate down either leg or around to the abdomen. They have been variously diagnosed as gallbladder or intestinal disease and sciatic neuralgia. There is an interesting cycle of exacerbation and remission that can be explained on a basis of changes in the state of the tumor, so that any trauma may produce swelling in the tumor which increases the tension and hence the symptoms. When this



(a) (b)

Fig. 1

(a) Photograph of autopsy specimen showing the large vascular spaces as compared to the normal vertebrae above and below. (b) Radiograph of the autopsy specimen showing large vascular spaces and thickening of the trabeculae. (After Gold.)

subsides, the symptoms subside. Roederer's[44] case developed all of her symptoms following a fall, as did one of our cases reported here.

The spinal fluid findings are of no significance. The use of iodized oil intrathecally in several of the cases of spastic paraplegia demonstrated a block in the flow of the fluid at the level of the lesion. Interestingly, in one case (No. 31, *Table 1*), this block disappeared after radiation therapy.

On the basis of the work of Gold and Perman, the radiographic findings (*Fig. 1*) were established by Bucy and Capp[6] in 1929. They are quite characteristic and should lead one to make the diagnosis with a fair degree of accuracy. In any case with back pain, or pain in the legs, or a compression myelitis, the possibility of a hemangioma of the vertebrae must be considered. The changes on the radiograph are the same as one sees grossly on sectioning a vertebra. There are areas of irregular absorption of the bony trabeculae and thickening of the remaining trabeculae resulting in parallel, vertical striations in the bodies. There may also be absorptive changes present in the pedicles, laminae, or the processes.

Rarely does one see compression, and only once (Zdansky[52]) has a complete sclerotic process of the vertebra been found. The French authors refer to the region of bony absorption as being porous or foamy, like soap bubbles. The typical findings as given by Bucy and Capp have resulted in the great increase in the number of cases published and are responsible for the diagnosis made in our cases. The lesion must be differentiated from Von Recklinghausen's disease of vertebra, giant cell tumor and metastatic malignancies. The findings are so extremely characteristic that only rarely should a mistake be made.

The early treatment as well as the clinical diagnosis of the disease was entirely surgical. The patient presented a picture of spastic paraplegia and a laminectomy was performed. On cutting the highly vascular bone tissue, profuse bleeding occurred and 60 per cent of the patients died from hemorrhage and shock. Even with im-

Fig. 2

Photomicrograph of tumor tissue showing the vascular channels filled with blood and lined by epithelium, also a bony spicule. (After Bucy and Capp.)

Fig. 3, Case 1

Radiograph showing large vascular spaces and vertical striations in the fourth lumbar vertebra. Note the extensive involvement on the left side of the body and pedicle.

proved technic and a definite preoperative diagnosis, the mortality rate for all cases operated upon stands at 33 per cent. The surgical procedure is a laminectomy to relieve pressure; there is no attempt made to eradicate the tumor itself. In four of fifteen cases operated upon, radiation therapy was necessary to relieve the symptoms. Perman,[40] in 1926, was the first to use radiation therapy, and he did this in conjunction with a laminectomy. Bucy and Capp had to use radiation completely to relieve their patient after laminectomy. Since then either one or both methods have been employed. Several cases have been treated by roentgen rays or radium with complete amelioration of the symptoms. The French authors seem to have divided the treatment, reserving radiation for those cases with pain, and laminectomy for those with spastic paraplegia. Nevertheless, both types of cases have been successfully treated by roentgen therapy, and it does not seem logical to subject a patient to an operation with a high operative mortality before radiation has been given a fair trial. In all three of our cases the radiation produced complete cessation of the symptoms.

The mechanism of the effect of the radiation can be explained on two bases. First, it is definitely known that one can produce changes in an hemangioma of the skin or other parts of the body by this means. This direct action upon the tumor is one of endarteritis and occlusion of the vascular spaces. Second, it is known that roentgen rays are analgesic in their action and this may be a factor in the relief of the pain in the cases with this syndrome. But above all, in those cases where it has been tried, it has produced symptomatic results without the necessity of resorting to a laminectomy. However, in none of the cases reported has any change been observed in the architectural appearance of the vertebrae following radiation treatment.

The quantity of radiation has varied in the cases reported. For the most part the rays are generated at 200 kilovolts and heavily filtered. The patient received about 200 roentgens at a treatment on successive days until 2,000 to 3,000 r had been given. One course has sufficed to produce results in nearly every case. Ireland, who was the only one to use radium, gave 1,200 mg. hrs. to the back at the level of the lesion with success.

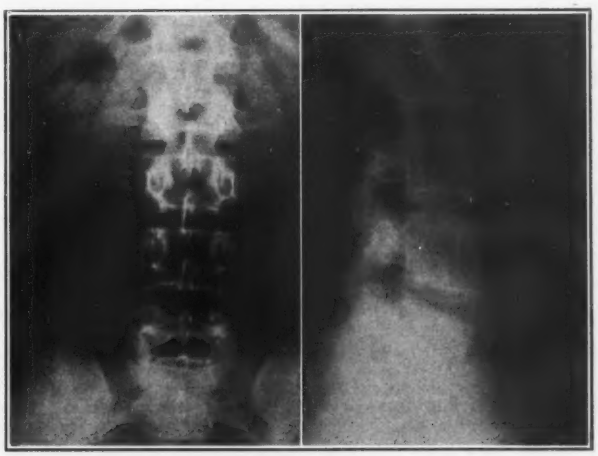


Fig. 4, Case 2

Radiograph showing thickened, vertical striations of the body of the fourth lumbar vertebra.

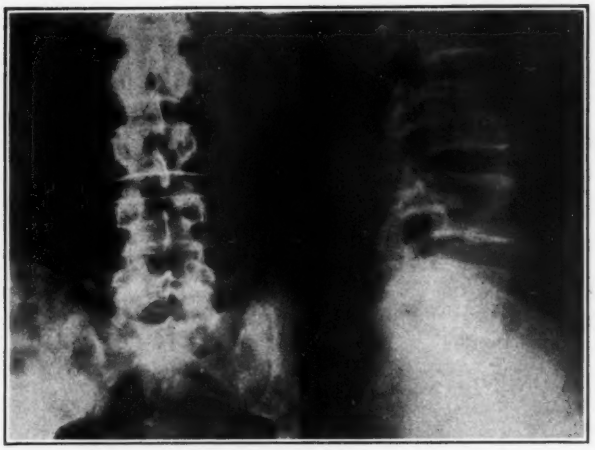


Fig. 5, Case 3
Radiograph showing the typical striations of the hemangioma of the fifth lumbar vertebra.

The report on our cases with treatment follows:

Case 1.—C. M., No. 33,935. The first patient seen by us was a female, aged 26, whose occupation was stenography. She complained of pain in the lumbar region which radiated down the inside of the left leg. This pain began spontaneously in February, 1935. At first it was more of an ache, and occurred at irregular intervals. A radiograph made in April, 1935, showed what was described by her physician as being a congenital deformity. She was advised to wear a supporting corset, which, in a period of five months, gave no relief. In the fall of 1935, there was a spontaneous remission followed by a recurrence of the pain in January, 1936. The patient then went to another physician, who made further radiographic studies, and in consultation with an orthopedist a brace was advised. This gave some relief from pain for four weeks. In July, 1936, the pain became severe and constant. The patient was hospitalized when our radiographic studies were made. She had pain in the back even at bed rest. There was some radiation down the inside of the left thigh with tenderness over the inside of the leg and a vague numbness in the foot.

Pertinent physical findings were some tenderness over the lumbar spine on percussion. No sensory changes were detectable and the reflexes were all present and normal.

Radiographs of the lumbar spine revealed changes in the bony architecture of the body of the fourth lumbar vertebra (*Fig. 3*). There were alternate, parallel, vertical areas of rarefaction and condensation. The lesion was more to the left half of the body and involved the left pedicle almost completely. Comparison with the earlier films, made in 1935, showed the same lesion present with no noticeable change. A diagnosis of hemangioma was made and radiation therapy advised.

Beginning September 26, 1936, she was given fifteen daily treatments at 200 kv. with 0.5 copper cu. 1 aluminum filter to right, left, and posterior lumbar areas. This totaled 2,550 roentgen units to three areas. From October 24, 1936, to February 24, 1937, she was given radiation treatment at 4 to 7 day intervals. The factors were 200 kv. composite thoreus filter through a 10 cm. portal to the fourth lumbar area posteriorly, 200 r were given at a treatment for a total of 3,520 r units. Immediately following the first series of treatments she returned to work, and has since discarded her brace, and has had no recurrence of pain a year later. There is no change in the bone architecture.

The interesting phase of the case is the problem of pain radiating down the left leg. Examination of the radiographs shows the lesion present in the left half of the vertebral body and involving the left pedicle which would be in close proximity to the nerve roots emerging between the third, fourth and fifth lumbar vertebrae. We feel that pressure on these nerves probably accounted for her pain on the left side.

Case 2.—J. R., No. 10,917, a man, aged 25, was seen at the William Volker Clinic with a complaint of pain in the right leg over a period of three years. It developed during the baseball season and caused him to stop playing, although he could remember no definite injury. It had been present at intervals since the onset. He said the pain began at the mid-gluteal region and extended down the posterior surface of the right thigh. Occasionally he had some pain on the other side. It was aggravated by twisting movements or at times came on without apparent cause. Sneezing and coughing caused sharp pain. No parathesis, paralysis, weakness or ataxia were present. Physical examination was essentially negative.

A neurological consultant suggested a spinal tumor, probably in the cauda equina. Radiographs of the lumbar vertebrae revealed definite areas of condensation and rarefaction in the center of the fourth lumbar vertebra which is typical of an hemangioma (*Fig. 4*). Radiation therapy was advised.

Beginning May 18, 1937, ten daily treatments of 200 r each for a total of 2,200 r were given to the lumbar and sacral areas at 200 kv. with a composite thoreus filter. The patient was then sent home for a month and upon his return all of his symptoms were gone. He had driven his car 500 miles and had been playing golf with no return of the symptoms. Six more treatments, totaling 1,200 r, were given. To date he is free of pain.

Case 3.—C. J. P. (No. 106,972), a man, aged 41, is engaged as a flying instructor in aviation. He entered the hospital complaining of pain in the back on both sides of the lumbar vertebrae. It was developed that he was subjected to hard bumps when the students grounded their planes. The pain came on after a particularly hard landing and he had been in bed a week when he was admitted to the hospital. Physical examination revealed tenderness on both sides of the lum-

bar area with no particular muscle spasm. There was pain on movement of the spine.

Radiographs show linear striations of the fifth lumbar vertebra with alternate areas of condensation and rarefaction (*Fig. 5*). A diagnosis of hemangioma was made. An orthopedist diagnosed the condition as sacro-iliac arthritis on the basis of a temperative course of 99 to 100 degrees daily. No changes were ever found in the sacro-iliac joints on the radiographs. We are at a loss to explain the low grade fever, and present the case with reservation, as we may not have explained the true cause of this pain by diagnosing the hemangioma of the vertebra.

Between July 26, 1937, and August 9, 1937, nine treatments were given at 200 kv. with 0.5 mm. copper and 1 aluminum filter for a total of 1,800 r. Following the treatment, together with physical therapy and three pounds traction on the legs for two weeks, the patient was able to resume his duties and is now doing instruction flying with no recurrence of symptoms.

SUMMARY

(1) We have presented three cases of hemangioma of the vertebrae which now brings the total to forty-three. This is but a small per cent of what must actually exist according to the pathological findings.

(2) It is a very characteristic disease from the radiological standpoint and should be diagnosed readily in any vertebra presenting paralleled areas of rarefaction and condensation giving the bone a striated appearance.

(3) It should be borne in mind clinically in any case of low back or leg pain, or a compression myelitis.

(4) The treatment of choice is radiation by roentgen rays, and in our cases, dramatic results have been obtained.

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RESECTIONS OF THE COLON AND RECTUM AND MEANS OF FACILITATING THEM*

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As indicated by the title, this paper is to deal almost exclusively with technical means of facilitating and expediting resections of the colon and rectum. The writer is entirely agreed that the colon should be empty and unobstructed at the time of the operation. A thorough decompression, cleansing, and diversion of the hardening fecal stream for some time before the operation is usually essential for operations on the left side of the colon.

In spite of the statements just made, resections of the right colon from cecum to mid-transverse colon have been done in one stage without any provision for proximal drainage or proximal drainage has been provided at operation. An effective distal and proximal drainage can be attained with the writer's Y-tube.

We all know that the right colon resections can be done without proximal drainage, but we mostly question the wisdom of retiring from any colonic resection without the safety valve of an ileostomy or colostomy against gas distention and pressure and the resulting anemia at the stitch line and perhaps late leakage. Of course, the gastro-intestinal tract has been kept empty for a period of five or six days, as well as the colon distal to the resection.

The one idea in mind and the effort made have been to complete the operation without possible contamination from drainage on the abdomen. Whether the advisability of resecting any part of the colon without proximal drainage be questioned or not, some of the cases to be cited in this paper are for the purpose of illustrating the efficacy of the surgical procedures employed. However, we not only usually employ proximal drainage, but also use a Y-tube as an effective means of decompressing both proximal and distal intestinal ends.

On the contrary, all resections of the colon on the left side have been provided with both preliminary decompression or colostomy or decompression and exteriorization. There is more than one reason for this difference; mainly because obstruction of the left half of the colon is 8 times as frequent as obstruction of the right. This is due to the more frequent occurrence of carcinoma

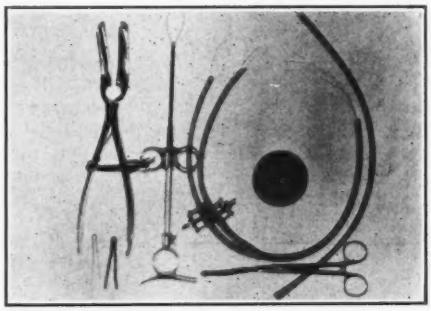

Fig. 1

There is assembled in this figure from left to right above: (a) hemorrhoidal clamp (Cooper). Note that the instrument is very strong in handle, lock, and blade. The strength of the blade is gained by width rather than by thickness; note, also, not only the thinness of the blades but a groove on one blade and a ridge to fit into it on the other; (b) a tonsil snare, with a cog and pin to hold the wire loop when it is drawn together; (c) a Y-tube with wire loops through the prongs, emerging at the single tube and armed with two Hoffman cut-offs; (d) a wide mouth nipple and bobby pins covered with rubber tubing.

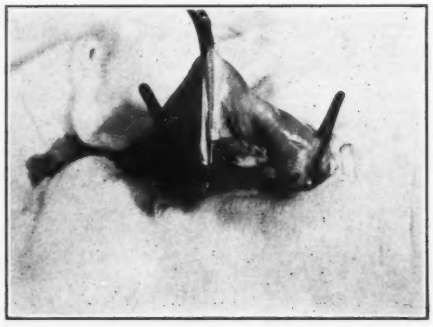

Fig. 2

The pile clamp crushes the intestine, expressing aside the muscularis and mucosa to a narrow, bloodless, translucent groove. The intestine under the crush of the clamp widens and following the curve of the clamp widens still farther. The contact of groove and ridge on the blades of the clamp holds the gut securely.

*Read in Section on Surgery, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

and diverticula, their location in the narrow lower sigmoid, the constricting character of the growth, and the hardening feces after passing the mid-point of the transverse colon. The operation most frequently used in obstructions of the colon is cecostomy, and the thought of surgeons is that it is almost impossible to do an aseptic enterostomy on a distended cecum without exteriorizing it. This can be accomplished by the adoption of our catheter enterostomy under a closed circuit. Moreover, this procedure can be readily accomplished in the transverse colon through a transverse incision. The distended cecum can also be avoided by doing the enterostomy in the terminal ileum and passing the catheter through the ileocecal valve, or using a dilated appendix.

As to the extent of resection of the bowel in relation to its mesentery and the lymph node bearing area, we do regard the lymph node bearing area somewhat as we do the axillary, inguinal or cervical lymph node groups, with the exception that the lymph nodes of the mesentery can be more readily visualized and palpated; and with the additional knowledge that colonic cancer is slow to metastasize, we feel that more limited stretches of the colon may be resected and that long lengths of bowel, merely to include all possible lymphatics in the corresponding mesentery, need not arbitrarily be sacrificed. Segments of colon are also resected for hypertrophic tuberculous ulcer, diverticulitis and megalo-colon.

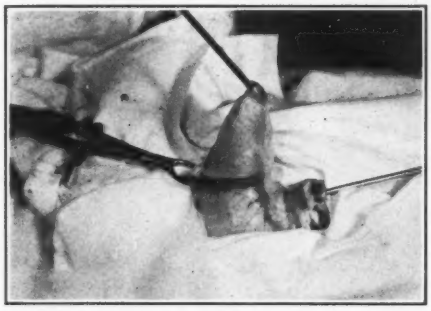

Fig. 3

The loops of two tonsil snares are placed around the duodenum or the lower sigmoid, as the case may be, and snared down. They are burned between, the lower end tucked into a pursestring suture, and the snare released by snaring through, or applying an electro-cutting current. The proximal end of the stomach or sigmoid is held with a tonsil snare and the end covered with rubber dam. One or two pile clamps crush the stomach or gut.

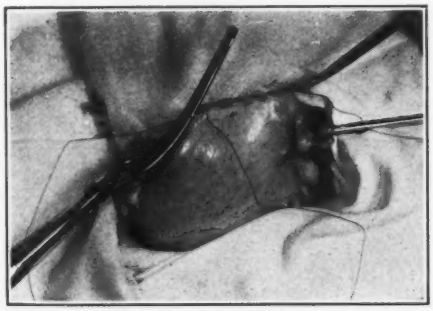

Fig. 4

After the part of the stomach or intestine to be resected is burned away with a thermo-cautery or electro-cutting knife, a basting stitch of fine wire is run in the narrow, bloodless groove or cuff as the clamp is opened and removed and the wire and cuff caught at each end with a small forceps. When two stomach or intestinal ends are so prepared, they are united by the simple process of abutting, stitching with a Lembert suture, serosa to serosa, behind and forward, withdrawing the wires and opening the two abutted ends by invaginating the stomach or gut through the opening.

Fig. 5

Two crushed and seared cuffs of stomach and intestine, with wire basting stitch about to be abutted. Note no bleeding, in spite of muscular area, no leakage, no encumbering packs or clamps. The absence of packs and clamps is a great advantage in doing a duodeno-jejunostomy or first stage of a resection of the rectum.

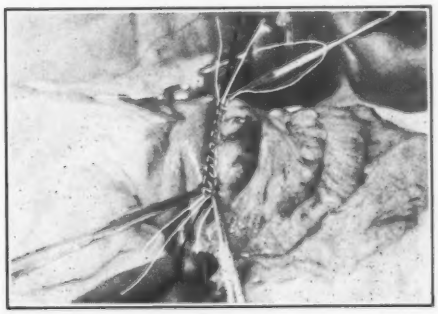

Fig. 6

Stomach and intestine abutted, first posterior stitch of silk, second of catgut.

We have seen in our experimental ureteral transplantations, particularly, and in our intestinal anastomosis, a temporary edema or light hemorrhage at the stitch line. In the case of a uretero-enterostomy this combined edema and hemorrhage of the intestine or ureter may be sufficient to cause a temporary obstruction and likewise offer some interference with healing. We therefore believe that intestinal ends should be abused as little as possible, the area of injury should be the least extensive, the blood supply absolutely controlled but reaching the intestinal ends. As narrow a cuff of the intestine as possible should be crushed and turned in, in the first place, to avoid an intra-intestinal diaphragm and also to allow additional intestine back of the narrow cuff for suture and better blood supply. With the small intestine, particularly in high and extensive resections, it is a great advantage not only to protect the anastomosis against travel over it and distension, but to drain the proximal end, to decompress both ends and likewise to deliver the intestinal juices to the distal intestine through the Y-tubes. This statement also applies with emphasis in infants who lose their intestinal contents with great depletion.

Different from the upper intestinal tract, the colon is highly infectious. Even an appendix stump may give rise to an infection; and the more obstructed the intestine, the more virulent the infection—therefore the necessity of joining intestinal ends with the least possible exposure of the mucous lining; the enterostomies must be done without any chance of leakage. In cases of obstruction of small and large intestine, the danger of soiling is much accentuated. We have carried out both single and double enterostomies as well as anastomoses under a closed circuit.

Therefore, while we do not consider a so-called aseptic technic and one carried out under a closed circuit and assured hemostasis the sole prevention of late infection, we do reckon it a

Fig. 7
Second posterior stitch of catgut sewn around anteriorly. Basting stitches, being cut and pulled out.

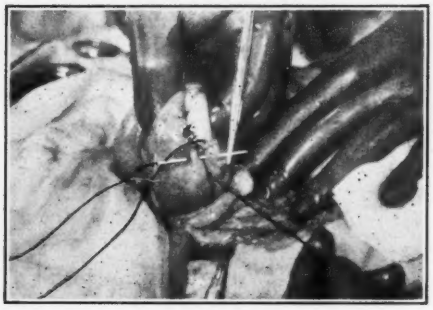

Fig. 8
First posterior stitch of silk being brought forward, to be tied to its own distal end.

Fig. 9
Anastomosis complete and cuffs being opened by invagination.

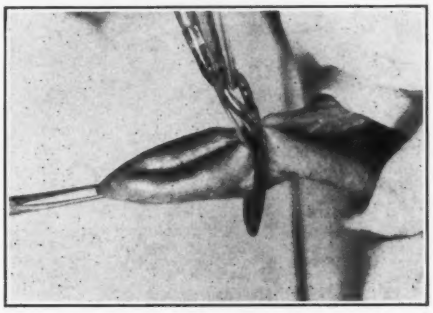

Fig. 10
Loop of gut crushed by single pile clamp and loop burned away.

very important point in the work, particularly if it be not cumbersome and slow, but, on the other hand, readily manipulated and quickly executed.

Several years ago, we brought to the attention of the Southern Surgical Association certain advantages of the hemorrhoidal clamp of the Cooper and Kelsey variety, placing it as a rival of the Kerr basting stitch and the Furniss instrument, and pointing out that these clamps are very strong in handles and lock, the blades are very narrow and the strength of blade is gained by the addition of metal in width, whereas the usual intestinal clamp loses in strength in proportion to its narrowness. These pile clamps are powerful crushers; and in addition along their narrow blades have a ridge on one blade and a groove on the other, so that the crushed mass, whether it be a hemorrhoid or intestine, does not slip. The tissues of the intestine and stomach yield as readily, or more so, than the hemorrhoidal mass under the crushing force of the narrow blade pile clamp, pushing mucosa and muscularis aside until there remains in the grasp of the clamp a very narrow translucent groove, with close adhesion of muscularis mucosae and serosa. When burned with a cautery and carefully liberated from the bite of the clamp, the narrow ridge or ledge remains adherent from its own cohesion.

To make the procedure entirely safe against opening the intestine, a fine piece of catgut or malleable wire is basted behind the clamp when applied to the stomach and jejunum or in the narrow cuff when liberated from the clamp. Or the intestine is clamped, clamp removed, the fine catgut or wire is basted through the crushed translucent groove, the groove recrushed and then burnt. The wire has an advantage in that it can be used to pierce the walls of the intestine and no needle is required.

Fig. 11
Pile clamp turned over and posterior stitch begun. Clamp is turned back and released.

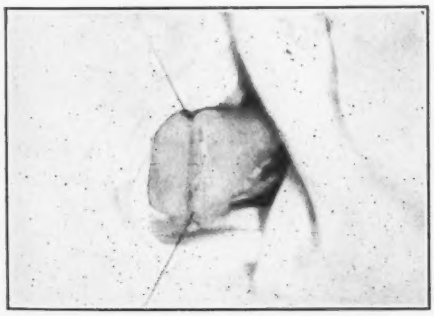

Fig. 12
The narrow, bloodless, relatively sterile cuffs remain adhered from their own cohesion. The posterior stitch is continued around anteriorly and the anastomosis is completed.

Fig. 13
The intestine is invaginated and the adherent cuffs opened up. This method of anastomosis is more sterile, more complete, faster than a Murphy button or any other method of anastomosis.

Fig. 14
Closed enterostomy with a single or double tube, Y-tube. A No. 1 tonsil wire is passed through the intestine. The wire is then passed through and out of a whistle tip catheter.

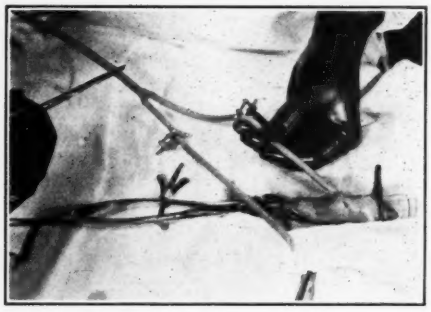

Fig. 15

A twist is given the loop of wire where it is passed through the intestine and through the catheter, making a loop. The wire loop and catheter end is then surrounded by a pursestring suture in the gut. As the wire loop and catheter tip is pushed down on the intestine, an electro-cutting current is applied to the wire where it emerges from the catheter. The wire loop and catheter end pass into the intestine as the purestring is tightened.

When the severed ends of the intestine have been so treated, by crushing and searing and remain adhered, they are joined together by the simple procedure of abutting the two ends and sewing them together. When the abutted ends are sewn around, the catgut or wire is withdrawn and the closed ends are opened in the intestine with thumb and index finger and the anastomosis is complete.

A whole loop of intestine liberated from its mesentery, or with the mesentery left intact, when the loop is free, may be grasped with a single pile clamp, the two ends of the loop in the grasp of the clamp burned away. The clamp is turned over, the intestine stitched, the clamp turned back and liberated; then the stitch carried all the way round, completing the anastomosis; or the two ends of the loop are crushed, the clamp temporarily removed, the fine catgut or wire basted through the grooves made by the clamp, the clamp reapplied, the two ends of the loop burned, the stitch started behind the clamp and continued around, or the clamp removed and the stitching done on the wire and the wire removed.

Having acquainted myself with the advantages of severing a ureter with a loop wire in a catheter after a stretch of the ureter is implanted, I have used this same device in doing an enterostomy after embedding the catheter in the intestine and have elaborated such an enterostomy, employing a Y-tube and double enterostomy distal and proximal to the anastomosis.

I have added to our equipment a couple of tonsil snares, for grasping the gut or stomach and holding on to it until resected or tucked in, or brought out through the wound in making a colostomy, particularly in resecting the rectum, while a second tonsil snare was tucked in the upper end of the rectum. The tonsil snare is also used for either snaring away the two extremities of an exteriorized intestinal loop or made to cut its way through by electro-cutting current applied to it. We have used two tonsil snares in doing an intestinal anastomosis. When the tonsil snare is used as a holding instrument on the end of the stomach or gut, though already seared with a cautery, the end is covered with a rubber dam or the finger of a rubber glove positively to prevent any contamination. A trivial but not unimportant gadget is furnished by hair clips, or bobby pins, covered with a small rubber tubing to hold back the contents of the small intestine. A wide mouth nipple may be used for fitting over an enterostomy or colostomy opening at the time of a second operation to protect the opening, or worn over a permanent enterostomy.

No instrument equals the pile clamp, however, for holding on to the stomach or gut, for making a narrow ledge, for hemostasis; and if the requirements of a so-called aseptic technic are: (1) an operation free from leak of contents or soiling; (2) bloodless during and after the procedure, leaving sufficient blood supply up to the union of serosa with serosa; (3) abutting closed ends to prevent leak and bleeding in the act of uniting the ends; (4) a narrow ledge or cuff to allow a wider opening and to prevent obstruction; (5) a technic to do away with cumbersome instruments while making the anastomosis and to do away with packs; (6) a

Fig. 16

A channel for the catheter is created in the usual way by suturing two folds of the gut over it.

simple procedure involving a minimum of manipulation to speed up the operation, particularly in cases of obstruction, then the pile clamp may favor every necessity.

The pile clamps and tonsil snares have been used for extensive resections of stomach, for pyloroplasty, for gastro-enterostomy, for duodeno-jejunostomy, and for resections throughout the colon and rectum. In tight places, as where one is anastomosing the duodenum and jejunum, the colonic flexures and down in the pelvis, it is an enormous relief to be able to crush and sear the bowel, place a basting of catgut or wire into the narrow, adhered and almost sterile cuff, and complete the anastomosis without clamps or packs.

We shall not dwell upon the accessory use of the pile clamp and tonsil snare in making ileostomies and colostomies under a closed circuit, of temporarily holding closed the blind end of the colon in C. H. Mayo's end-to-side ileo-colostomy, and of crushing the two "gun-barrels" of a Mikulicz exteriorization operation, or Paul's method.

210 Professional Building

DISCUSSION (*Abstract*)

Dr. J. D. Rives, New Orleans, La.—Peritonitis is no longer a serious problem in elective abdominal surgery except in surgery of the colon, in which it is still the chief and most frequent cause of failure. The infection usually results from leakage after operation, less often from contamination at the time of operation. Four separate precautions must be taken to avoid the infection:

(1) The colon must be properly prepared, that is, it must be emptied of its septic contents as completely as possible.

(2) The blood supply at the point of anastomosis must be preserved, so that leakage may be prevented.

(3) Any anastomosis attempted upon the colon must be as nearly aseptic as possible.

(4) The suture line must be water-tight and gas-tight, and so strong that it will resist moderate degrees of tension.

We have long been accustomed to expect from Dr. Brenizer ingenious technical procedures that make it possible for us to accomplish with ease things that previously had been very difficult. Two of the suggestions he has made in this paper I propose to comment on, and I shall begin by questioning the value of the double enterostomy with Y-tube which he has described. If the anastomosis is in the small bowel, there is an advantage in keeping the intestinal contents within the bowel. On the other hand, there is a distinct risk in having even one enterostomy opening in the small bowel; it has been our experience that such openings do not always close spontaneously, and their later operative closure is likely to be most difficult and hazardous. In addition, I feel that subsequent function of the intestine may be seriously interfered with by the fixation, and, in some instances, what amounts to the mutilation, of the involved intestinal loop. If an end-to-end anastomosis cannot be trusted to remain patent during the immediate postoperative period, I believe I should prefer a side-to-side anastomosis, in which the opening is ample and the danger of obstruction minimal. In resections of the right half of the colon, in which end-to-side anastomosis of the ileum to the colon is done, it is my impression that proximal enterostomy is sufficient, since the anastomosis will function satisfactorily within a period of three or four days. These are operations of election, and if the patient is properly prepared by transfusion and the free administration of fluids, the loss of intestinal contents by way of the enterostomy is not a serious matter. I feel that Lord Moynihan was correct in advising a side-to-side anastomosis which requires no proximal safety valve.

The end-to-end anastomosis of the colon which Dr. Brenizer has suggested seems both simple and effective. That such a method is needed is amply attested by the multiplicity of procedures devised for this purpose by many eminent intestinal surgeons. The Halsted method of aseptic anastomosis, the Parker Kerr basting stitch, the Rankin clamp technic, the Furniss clamp technic, and the new clamp technic recently reported by Harvey Stone, all have been directed toward the solution of the problem of aseptic anastomosis of the colon. As Dr. Brenizer has pointed out, both the Rankin and the Furniss clamp produce an inconveniently wide cuff to be turned into the lumen of the bowel. The Parker-Kerr method has somewhat the same disadvantage, and requires, in addition, that a needle be passed repeatedly through the lumen of the colon. Both these disadvantages Dr. Brenizer's suggestion eliminates. The hemorrhoid clamp results in a very narrow strip of crushed bowel, and even if a basting stitch must be used, the narrow cuff of bowel produced by the narrow clamp is distinctly advantageous.

Dr. Howard Mahorner, New Orleans, La.—The several ingenious technical improvements offered by Dr. Brenizer are noteworthy, and I am ready to accept some of them as worthy of adoption. The idea of using the pile clamp for facilitating anastomoses seems to me to be a very rational one. Whereas, experience with this method has probably shown him that there is little chance of contamination from accidental opening of the ends of the intestine approximated by the clamp, one could not at first but have some hesitancy about depending for security alone on adherence of the lips of the severed bowel.

In by far the majority of instances, in operating for a lesion of the cecum or ascending colon, I would elect to do an ileo-colostomy as a preliminary procedure without decompression by enterostomy beforehand. Moreover, at the time of ileo-colostomy I would choose a proximal enterostomy to relieve any possibility of tension on the suture line.

The question as to whether an enterostomy should be done distal to the ileo-colostomy as well is debatable. Under ordinary conditions the added risk of doing an enterostomy distal to the anastomosis is not justified by the risk of distention on that side causing a leak in the suture line. The rationale of the enterostomy is to alleviate any temporary obstruction which may be caused at the line of suture. Thus, it is advocated on the proximal segment.

In lesions high in the small intestine it might be

desirable to reintroduce into a more distal segment the contents which are coming out of one enterostomy. However, in the terminal ileum and in the colon the contents lost through an enterostomy tube will not cause the patient such a deficiency of electrolytes and fluids that it will justify the risk of making an additional enterostomy distal to an anastomosis.

Dr. Brenizer (closing).—I want, first of all, to thank the gentlemen who have discussed my paper. There seems to be no disagreement as to the possible efficacy of the devices suggested to facilitate resections of the colon and rectum, nor the method of a closed enterostomy executed with the catheter, wire loop and electrocutting current. There is objection to the Y-tube double enterostomy, namely, "that a double enterostomy, proximal and distal to an anastomosis of the bowel, would lame and hamper the bowel too much and would cast a doubt as to the author's confidence in his own anastomosis."

The author, probably, did not make it clear in stressing the technical phase of his methods with which his paper largely deals, that the Y-tube is used mostly in cases of strangulation of the bowel, hernia, intussusception, mesenteric thrombosis, where the bowel is exteriorized for observation, and it is desired to decompress the bowel above and below and to bridge the exposed gut for the purpose of continuing the intestinal stream, particularly in children who lose their intestinal contents poorly and for alimentation. The cases of end-to-end anastomosis of the right colon without any means of decompression would indicate an entire confidence in his method of anastomosis. As a suggestion to the author of the paper given just prior to this one, the pile clamp is an excellent instrument for crushing the appendix stump; the stump, when seared with a cautery, remains adhered by its own cohesion, bloodless and relatively sterile, and may be tucked through a purse-string suture without an extra tie on the stump.

PRACTICAL ODDS AND ENDS*

By H. R. SHANDS, M.D.
Jackson, Mississippi

The purpose of this short paper is to describe briefly several simple procedures and appliances which have proven of value to us in the management of our surgical cases.

(1) The Kaufman-Luer syringe was demonstrated by Dr. Ravdin, of the University of Pennsylvania, ten or twelve years ago at a meeting of the College of Surgeons. This syringe is like an ordinary Luer hypodermic syringe, but has an opening on the side of the syringe to which the tube from the saline or glucose container can be attached. When the needle on the end of the syringe is introduced into the distended vein, the plunger is shoved back automatically and the solution begins to run through the needle. Its use makes exceedingly simple the procedure of giving intravenous drips and other medication. With this the vein can be entered much more easily and there is no spilling of blood. It is practically never necessary to cut down on a vein when this little appliance is used. We were surprised to learn two years ago at a meeting of the Southern Surgical Association that many surgeons, when wanting to give a continuous drip, still introduce a cannula into the vein, necessitating an open operation. The simple puncture of the vein with a needle applied to the Kaufman-Luer syringe has very many advantages over the use of the cannula in the vein.

In the past year we administered to a patient eighty-five intravenous glucose drips and twenty-six blood transfusions within six weeks following operation, each time using the simple puncture of the vein. This patient, who was badly jaundiced, did not have a single thrombosis of his veins from the puncture of the needle. This was a most unusual experience, and no doubt he had a large amount of heparin or some other anti-coagulant in his blood as a result of the long-continued jaundice. However, the veins can be used much longer and with much less damage if they are simply punctured with a needle rather than cut down upon. A very small needle may be used. When a cannula is introduced by open operation the vein is destroyed and a scar is left over the vein. There is always some danger of infection when an incision is made in the skin. Our glucose drips are always given by the technicians in the laboratory; and so simple is the procedure with the use of this syringe that we have no hesitancy in having our blood transfusions administered by the assistants in the laboratory, though they are not doctors or nurses. The syringe can be fastened to the arm or leg with adhesive plaster and the drip given continuously as long as desired. When the operation is performed under spinal anesthesia, at times the blood pressure falls so low as to make it most desirable to have saline promptly given intravenously. It is our practice to start intravenous saline as soon as the spinal anesthetic is introduced. Most often we use a vein in the foot or leg for this purpose, as this procedure keeps the drip-stand out of the way of the surgeon and his assistants. We believe that anyone using the Kaufman-Luer syringe to administer his intravenous drips or blood transfusions will at once recognize its value.

*Read in Section on Surgery, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

Fig. 1
Kaufman-Luer Syringe.

(2) On several occasions before this Association, Dr. Hugh Gamble, of Greenville, Mississippi, has recommended, as a means of preventing phlebitis and thrombosis and pulmonary embolism, the exercising of the lower limbs after operations. Following Dr. Gamble's advice for the past twelve months, we have universally had the bed bicycle used two or three times daily for five minutes at a time on all operative cases. We have no doubt whatsoever that the incidence of thrombosis has been greatly reduced by the use of this apparatus. Dr. Gamble reports in a recent letter that in three thousand and ninety-one operations in which this bed bicycle has been used postoperatively, only three cases of postoperative phlebitis have occurred. Within the past year we have used this apparatus in somewhat more than eight hundred cases. Only one patient developed phlebitis in the hospital; however, two of our cases reported development of a mild phlebitis after returning home. Dr. Gamble reports that in the first above-mentioned number of cases he has had no case of pulmonary embolism. In eight hundred cases which we have had in the past year, there has been no case of pulmonary embolism.

We use regularly with this apparatus inhalations of carbon dioxide and oxygen every four hours for the first two days. Our routine orders following operation are: The use of carbon dioxide and oxygen inhalations every four hours after the patient is awake for the first twenty-four to forty-eight hours, and then deep breathing for five minutes two or three times daily. Also the bed bicycle is ordered used for five minutes twice daily while the patient is in bed, beginning twelve hours after operation. Dr. Gamble has fully described this procedure and apparatus, consequently it is not necessary for me to enter into a prolonged description; it is my purpose merely to insist that his method of treatment has great value.

Dr. C. W. Mayo, in the 1935 Collected Papers of the Mayo Clinic, reports 1,066 hernia operations following which there developed 21 cases of postoperative phlebitis. This incidence of phlebitis was much greater when a double herniotomy was done. The incision in an inguinal or femoral hernia is so situated as to cause exercise of the lower limbs to be rather more painful than after other abdominal operations. This fact probably contributes to this surprisingly large (2 per cent) incidence.

These above described procedures are very helpful, or we have had unusually good luck with this distressing and usually unforeseen complication. Within the past year one of our patients died of postoperative mesenteric thrombosis (proven by necropsy) four days after an operation for the ligation of the superior thyroid arteries. The patient had been given iodine for several months before admission to the hospital, and suffered from extreme hyperthyroidism. She was iodine-fast and thyroidectomy could not be done. Her death would indicate that the ad-

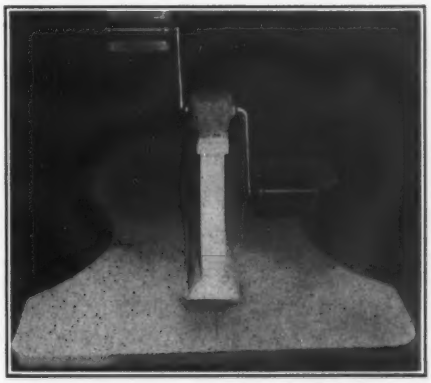

Fig. 2
Bed Bicycle.

ministration of thyroid extract is not always efficient in the prevention of postoperative thrombosis. She had a basal metabolism of plus sixty, a very rapid pulse, excessively high blood pressure, and her kidneys contained four large stones. After the operation she was so weak and her condition so critical that the bed bicycle was not used.

(3) Dr. Gamble has also repeatedly advocated the open treatment of postoperative wounds in cases of peritonitis, especially following a ruptured appendix or other hollow viscus. We have adopted his plan in this connection for the past year and are well pleased with it. No description will be entered into of his method of treating these wounds, as he has a demonstration of this method at this meeting. We, however, take great pleasure in endorsing this method of treatment, after considerable experience with it. The statistics which he presents are almost unbelievable. He reports a mortality of not over 2 per cent in cases of ruptured appendix. To be exact, 1.8 per cent in 160 cases of generalized appendicitis. Three deaths in 160 cases over the past 12 years (peritonitis from private communication). We have no reason to doubt his statistics, though they certainly stretch our credulity. We have not been able to obtain such favorable results ourselves. We think a mortality of 9 to 10 per cent following an operative treatment of ruptured appendix, in general, is quite good.

(4) For the past two years we have routinely used paraldehyde by rectum preceding gas anesthesia. The rule is to give 15 c. c. of paraldehyde in three ounces of starch water for each one hundred pounds of body weight. This is administered by rectum, one and one-half hours before the operation. With the use of paraldehyde in this manner, almost any intra-abdominal operation can be done with the use of practically no ether, when cyclopropane is chosen as the anesthetic agent. Paraldehyde has seemed to us to offer many advantages. First of all, the patient knows nothing of the operative procedure, and has very little memory of the operative day. Relaxation under paraldehyde by rectum and cyclopropane by inhalation is generally quite satisfactory, and is safe. The technic of the administration of paraldehyde by rectum as a pre-anesthetic agent has been described a number of times and can easily be found in the recent literature. Certainly the shock is less with this combined anesthesia than with ether.

(5) Most of our patients are more or less financially embarrassed at the time it is necessary for them to have surgical treatment in the hospital. This fact has caused us to discharge the large majority in the ambulance as soon as it is safe. Fully 90 per cent of the patients operated upon in the Baptist Hospital, Jackson, Mississippi, leave the hospital in an ambulance. This makes it possible to save much hospital expense to the patient, and we have seen no harm result therefrom. The average case of appendicitis leaves the hospital in five or six days; labor cases frequently in three days; gallbladder cases and hysterectomies quite frequently within a week. The general use of the ambulance, so that patients can go home in a recumbent posture, enables them to meet hospital bills much more easily and also makes it possible for them more readily to pay the surgeon his fee. The plan results to the advantage of everyone concerned. The patient saves money on the hospital bill and can get home early; the hospital receives more money for each day of hospitalization, because, as a rule, the expense to the hospital the first week is 70 per cent of what it would be for the first two weeks in surgical cases; and the surgeon is paid more promptly.

The Baptist Hospital, Jackson, Mississippi, has 110 beds. Last year there were treated in the Baptist Hospital 4,643 bed cases. Owing to the fact that we move our cases out promptly in ambulances, we were enabled to handle as many patients as were treated in many of the leading hospitals of America which have 300 beds, thus saving capital outlay on hospital buildings.

DISCUSSION (*Abstract*)

Dr. George W. Waldron, Houston, Tex.—Dr. Shands has simplified the technic of intravenous therapy to a point where it can be carried out by laboratory assistants. Blood transfusion, whether by the direct or indirect method, should seldom be a troublesome procedure. I feel that it is almost never necessary to cut down on a vein to give a transfusion and I cannot believe that the open method with the use of a cannula is often the method of choice. If one makes a simple venous puncture, glucose may be administered through the same vein daily for many weeks provided the vein is thoroughly washed out with saline at the end of the process.

Exercise of the lower extremities seems to be the best means of avoiding the onset of postoperative phlebitis and thrombosis. The bed bicycle facilitates exercise of the right type. I have used thyroid extract postoperatively, but have never been sure of a beneficial effect.

Dr. Shands' results following the open treatment of wounds in cases of peritonitis, according to the method of Dr. Gamble, have been most noteworthy. Incidentally, it is surprising how well these wounds heal in most cases.

There is no question that the practice of removing

postoperative cases from the hospital by ambulance at an early date is sound. Many cases can be at home within a week. The financial saving is noteworthy and, as far as I know, I have never seen a complication arise which could be attributed to the move. In a city where there is a shortage of hospital beds the hospital authorities welcome this practice.

I should like to point out another practical procedure, the use of ordinary chewing gum for facilitating the closure of intestinal fistulas which drain externally. A large wad of gum can be stuffed into the opening as described by Judd and Phillips in "Surgical Clinics of North America," June, 1934. These openings usually have areas of inflamed and macerated skin about them and they are particularly annoying and uncomfortable. When the drainage is held back the tracts sometimes heal without further surgery or at worst the subsequent closure is made easier after a week or two of using the gum.

A very small hot water bottle for collecting bile which is draining from a T-tube placed in the common bile duct for prolonged drainage is another useful appliance. The stopper can be drilled in two places and a metal tube inserted through one of the holes to connect onto the tip of the T-tube. The apparatus is inexpensive, light, flat and comfortable to wear, and there can be no spilling of bile.

Dr. E. A. Ficklen, New Orleans, La.—Dr. Shands' paper emphasizes practical and non-controversial suggestions, with the exception of that relating to the prophylaxis of postoperative thrombosis and embolus, by bed exercises and inhalations of carbon dioxide and oxygen. E. H. Pool, in 1913, advocated active and passive movements of the limbs. That his advice is not generally followed is apparently due to several factors: first, the difficulty in execution. Postoperative cases demand rest and quiet; secondly, the low incidence of fatal thrombosis. Korganova-Muller reported 72 cases of thrombosis and 41 of embolism in 4,621 necropsies in the Babukin Hospital, Moscow, from 1927 to 1933.

In the masterly article of Pickering in the "Cyclopedia of Medicine," the following significant paragraph occurs:

"Fatal postoperative pulmonary embolus is relatively rare in England and America. Speed gives a mortality of 0.07 per cent in 57,000 major operations performed at St. Mary's Hospital in Rochester and Patey furnished only 50 cases in 54,523 major operations performed in 31 London hospitals."

Pickering analyzed the records of three hospitals and found that postoperative thrombosis was diagnosed in from 1 to 1.8 per cent of the cases.

Of the factors that predispose to thrombosis it is advocated that the following are outstanding: trauma, old age, obesity, slowing of the venous circulation, diseases of the heart and blood vessels and certain intrinsic changes in the blood elements, as well as variations in the tensions of oxygen and carbon dioxide of the blood. It seems that as a general rule the fibrinous content of the blood is increased postoperatively, but this is not always the case.

The theory that measures to promote venous circulation and to increase the tidal air are beneficial, rests on the assumption that slowing of this circulation and decrease in tidal air are of prime importance in the production of thrombosis. This is at least open to discussion. And the question arises as to when thrombosis of the pelvic, femoral and saphenous veins occurs. These vessels are mentioned particularly as being admittedly the most frequent source of fatal and non-fatal pulmonary emboli. Once a thrombus has formed all forms of exercise are definitely contraindicated until the thrombosis is believed to be fixed.

Boyd, in his "Surgical Pathology," makes this statement:

"Pulmonary infarction usually occurs during the second or third week of convalescence. Fatal embolism may occur during the first two or three days. I once saw three such cases in the course of a month."

There is no definite proof that thrombosis may not occur during the course of an operation, or immediately thereafter during the period of shock. We have no clue to the existence of a thrombosis and I suggest that from the surgeon's standpoint we divide thrombi into two classes: first, silent thrombi, the existence of which is not suspected and cannot be diagnosed until embolism occurs; second, septic thrombi, characterized usually by left-sided pain, septic fever and the occurrence of edema in the left leg due to associated lymphatic blockage. Exercise and increase of the diaphragmatic excursions in early and rapidly formed thrombi might produce fatal embolism. As surgeons we must maintain open minds. Any measure which by clinical test reduces morbidity or mortality is worthy of consideration. Whatever other prophylactic measures are adopted, and hosts have been proposed ranging from massage to calcium therapy, precise surgical technic plays an all-important role.

URETERAL ECTOPIA*

CASE REPORTS WITH DISCUSSION OF TREATMENT

By HOUSTON S. EVERETT, M.D.
Baltimore, Maryland

Cases of abnormally placed ureteral orifices are rare, but stimulate such interest that when recognized they must rarely escape publication. Thorough reviews of the literature by Kilbane,[1] Thom,[2] Sargent[3] and Alt[4] leave little to be desired in this regard. I should like to place on record, however, three cases recently encountered, and to emphasize the usefulness of the method of treatment employed in one of the cases (Case 3).

CASE REPORTS

Case 1.—L. R., a white woman, aged 40, was seen and treated in the Cystoscopic Clinic of the Johns Hopkins Hospital in 1929. She complained of bladder pain, frequency, and slight incontinence of ten years' duration. The urine was uninfected and otherwise normal and examination of the bladder revealed normal findings with two ureteral orifices situated in their normal positions. On withdrawal of the Kelly cystoscope through the urethral sphincter a spurt of clear urine was seen to come

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*Read in Section on Urology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

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from a third orifice situated in the right side of the sphincter. This was found to be the orifice of the ureter leading from the upper and smaller pelvis of a double right kidney. Strictures were demonstrated in all three ureters by the wax bulb test and pyelo-ureterograms, and the patient was treated by a series of ureteral dilatations with considerable relief. The incontinence was slight in amount, as the accessory ureter was subject to some control by the urethral sphincter, and as no serious lesions were demonstrated in this ureter or the renal segment drained by it, no operative procedure seemed indicated.

Case 2.—B. G., a female infant, aged 8 months, was admitted to the Harriet Lane Home of the Johns Hopkins Hospital on February 4, 1935, seriously ill with otitis media, retropharyngeal abscess, scattered rales in both lungs, and a painful mass in the right lower quadrant. Bimanual abdomino-rectal palpation of this mass caused pus to gush from the urethra. The urine contained relatively little pus as compared with the amount expressed through the urethra.

The retropharyngeal abscess was incised and drained on February 5 and on February 7 the abdominal mass was explored. It was found to be retroperitoneal and to contain much pus. It was incised and drained and a bit of tissue was removed which, on microscopic study, proved to be kidney. The child improved for a time after this and intravenous pyelograms were taken which showed a double kidney pelvis and double ureter joining just above the bladder on the left side. On the right side none of the contrast medium appeared. On February 28, the patient was cystoscoped, using a No. 6 Kelly speculum. The bladder appeared about normal. There was slight reddening on the right side of the trigone about where the right orifice should have been, but no orifice could be seen or probed. The left orifice was seen in normal position and catheterized. The retrograde pyelogram confirmed the anomaly found with the intravenous plates. On withdrawal of the cystoscope the urethra was searched for an ureteral orifice, but none was found.

About a month after admission the child developed bronchopneumonia, but gradually recovered. On March 24, the phenolsulphonephthalein excretion was 75 per cent in two hours. On April 18, the pyonephrotic aberrant right kidney and part of the greatly dilated ureter were removed by Dr. Guy L. Hunner. Recovery was uneventful and on May 3 the phenolsulphonephthalein excretion was 90 per cent in two hours. The child was discharged from the hospital on May 5 and was readmitted on July 12, again suffering from pneumonia. She recovered and was discharged on July 30. She was last seen on October 21, 1935, when she was found to be quite healthy and developing normally except for retardation of walking.

No ureteral orifice was ever seen in the urethra in this case, but the presence of approximately normal bladder urine and the discharge of pure pus from the urethra on pressure over the pyonephrotic ectopic kidney leaves little doubt that the right ureter opened in this location.

Case 3.—S. S., a girl, aged 10 years, was admitted to the Church Home and Infirmary on July 30, 1935. Her chief and only complaint was constant leakage of urine since birth in spite of normal periodic voiding. Aside from this she had been a healthy child and had developed normally in every way. General physical examination showed normal findings. The right kidney was easily palpable on inspiration, but was not tender. No other organs or masses were felt and no tenderness was elicited in the abdomen. On inspection of the genitalia the skin of the vulva and buttocks showed a slightly reddened, scalded appearance. The vaginal orifice seemed to stand open more widely than normal, and on its right margin, just posterior to the urethral orifice, was a bulging, glistening area in the mucosa about 8 mm. in diameter. There was a constant dripping of clear fluid from this region, some of which flowed back into the vagina. On close inspection there appeared to be a very small linear slit in the mucosa over the swollen area, but this could not be entered with the very finest probes or filiforms (*Fig. 1*).

The bladder was examined through a number 6 Kelly cystoscope and appeared quite normal. The urine was normal in every respect. Two normal ureteral orifices were found in their usual positions, and the right one was catheterized with a number 7 French renal catheter without difficulty. The urine which flowed from this catheter was grossly clear and microscopically normal. After removal of the cystoscope from the bladder a larger one was introduced into the vagina in order to search for a possible orifice of the aberrant ureter there. A tiny ridge was seen extending up along the right lateral wall of the vagina from the bulging area at the outlet, but no opening could be located.

The patient was then given 12 c. c. of neo-iopax intravenously and a series of roentgenograms made, the catheter in the normal right ureter being plugged to prevent escape of the opaque solution. The plates showed a normal kidney pelvis and ureter on the left side, and a double pelvis and ureter on the right. The lower pelvis was well formed and normal in appearance and drained into the ureter containing the catheter. There was only one calyx connected with the small

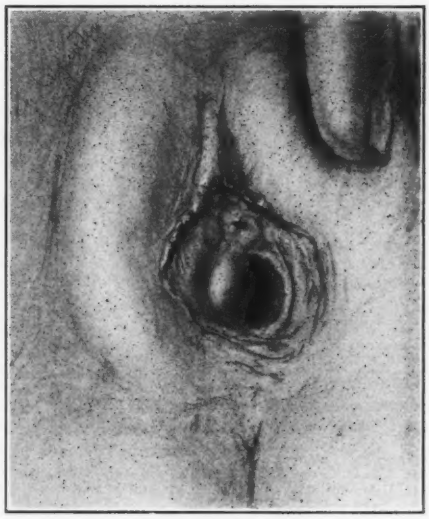

Fig. 1

External genitalia showing bulging prominence to the right of the vaginal orifice. This prominence marked the site of the orifice of the ectopic ureter; and a steady dripping of urine occurred from this region.

Fig. 2
Intravenous pyelograms made after catheterizing the normally placed right ureter and plugging the catheter. Note the double pelvis and double ureter on the right side.

upper pelvis and this was somewhat dilated. The ureter from this pelvis passed downward apparently behind the normal ureter and showed moderate dilatation in its upper portion (*Fig. 2*). At the point where the two ureters were most closely approximated each of them appeared to be about 6 mm. in diameter, and an anastomosis of the upper ureter into the lower one was considered, but upon advice of Dr. Hunner this idea was abandoned and ligation and resection of the aberrant ureter in its abdominal portion decided upon instead.

Operation was performed on August 6. The patient was first cystoscoped and the normally placed right ureter catheterized in order to be able to distinguish it from the aberrant one. A right McBurney incision was then made down to the peritoneum, which was then separated from the abdominal wall until the ureters were exposed where they crossed the pelvic brim. They were then freed from their bed and brought up into the incision and it was seen that the two of them lay within the same thin periureteral sheath. The aberrant one was found to consist of a white cord only about 3 mm. in diameter. It was separated from the normal ureter for a distance of about 8 cm. and two ties of medium silk were placed around the upper end of this segment about 1 cm. apart and one similar tie around the lower end. The intervening segment was excised and the incision closed without drainage. The lumen of the excised segment would admit only the finest probe.

The child made an uneventful recovery and left the hospital on August 16, ten days after the operation. There was slight elevation of temperature up to 100° F. for the first three days, but there was no pain and no tenderness on palpation over the right kidney. The constant urinary leakage stopped immediately, but there was some enuresis, which persisted for several months, but which had ceased except for an occasional bed wetting when the child was again seen on March 21, 1936. This was no doubt due to faulty habit acquired during the years when bed wetting by voiding could not be distinguished from that due to the constant leakage. On March 21, 1936, the child appeared to be a healthy and normally developed girl for her age. The external genitalia appeared quite normal, the bulging area to the right of the vaginal orifice having entirely disappeared. Intravenous pyelograms taken at this time showed both pelves and ureters normal (*Fig. 3*).

INCIDENCE AND DIAGNOSIS

Altogether about 200 cases of ectopic ureteral orifice have been reported, and in general they have been found about twice as frequently in females as in males. Kilbane,[1] in 1926, reviewed 100 cases, of which 65 were in females and 35 in males. Thom,[2] in a collected series of 185 cases, found 122 females and 63 males, and Sargent,[3] whose series is the same as Thom's, with one case of his own added, found 123 females and 63 males. Furthermore, the diagnosis is made clinically much more frequently in females. In Kilbane's series the diagnosis was made clinically in 57 of the 65 females and in only 2 of the 35 males, 33 males and 9 females having been diagnosed at autopsy. In Sargent's series 94 of the 123 females were diagnosed clinically and only 6 of the 63 males. The others were diagnosed at autopsy.

The failure to make a clinical diagnosis in the

Fig. 3
Intravenous pyelograms made eight months after operation.

male, according to Sargent, is due to the fact that the aberrant opening which may be situated in the prostatic urethra, ejaculatory duct, seminal vesicle, or vas deferens, is always within the external urethral sphincter so that urinary leakage is not a symptom. In the female, on the other hand, the misplaced orifice may occur within the urethra, in the vestibule, or within the vagina or uterus, and urinary incontinence is nearly always a symptom leading to search for and discovery of the anomaly. In an occasional case where the ureter which opens into the urethra is subject to pressure from the urethral sphincter incontinence may not occur. Such a case has been reported by Davis,[5] who collected 5 other similar cases. This was almost the state of affairs in our Case 1, in whom the incontinence was of very slight amount. The incontinence which is usually present in the female is of a peculiar type in that there is a constant leakage of urine, but at the same time normal periodic voiding. This system is practically pathognomonic of such an anomaly and attention to this point on the part of pediatricians should lead to earlier diagnosis of the condition than has generally been the case in the past. The frequent association of serious lesions of the upper tract with these anomalies suggests that early diagnosis and treatment may be of considerable importance.

TREATMENT

Treatment in the past has consisted of nephrectomy, heminephrectomy, ligation of the ureter either abdominally or vaginally, or some type of implantation of the ureter into the bladder, and in two cases anastomoses were performed successfully between the two pelves. According to statistics collected by Sargent,[3] nephrectomy and heminephrectomy have met with success in all cases in which they have been used, the former in 22 cases, the latter in 16. When the normally drained segment of the kidney is normal or nearly normal, nephrectomy seems too radical, for the presence of a stricture or its later development in the remaining ureter, or injury of any sort to the remaining kidney or ureter, may jeopardize the life of the patient. The various types of operations for transplantation of the aberrant ureter into the bladder were successful in 30 out of 46 cases. The greatest incidence of failure was in those cases in which the transplantation was done through a vaginal approach, eight failures out of 26 cases. Some type of transplantation is justifiable and even strongly indicated where the aberrant ureter is the only one draining a well functioning kidney, but when, as is usually the case, the aberrant ureter is the one draining the upper pelvis of a double kidney, the function of the segment drained by it is usually insufficient to warrant any great effort to save it. When this is considered together with the fact that transplantation often leads to an intractable cystitis in a previously normal bladder, these types of operation seem contraindicated in most cases.

Vaginal ligation of the aberrant ureter, according to Sargent,[3] has been done 6 times with 4 failures. Two of these failures were in his own patient, whom he later cured by implanting the lower end of the ureter into the bladder, drawing it into the bladder through a vaginal cystotomy by means of a hemostat inserted through the urethra. I have found one other case of vaginal ligation, that of McKay,[6] which was also a failure, but the patient was later cured by resection of the upper pole of the kidney.[7]

Aside from nephrectomy and heminephrectomy the only method of treatment which has met with complete success in every case in which it has been used is that used in our Case 3, namely: abdominal ligation and resection of the aberrant ureter. This method, however, has been neglected and even condemned as a bad surgical principle. In the presence of infection or when the ureter drains an appreciable amount of functioning kidney these objections are, of course, sound, but when, as in our case, there is no infection and there is evidence that the kidney substance drained by the truant ureter was not only originally small, but has already undergone some atrophy from partial obstruction below, the method offers an entirely safe method of cure and at the same time subjects the patient to the surgical procedure of the least magnitude of any of those offering the same probability of satisfactory result. This contention is borne out by 8 cases treated in this way, all with entirely satisfactory results. This group of 8 cases includes our own, and the other 7 have not previously been gathered together in one paper.

Sargent found only 3 such cases, those of Kudji,[8] Juvara,[9] and Ries.[10] Sargent, however, had missed at least 2 cases, for Kilbane, who published four years previous to Sargent, stated

that 4 cases had been treated successfully by this method, and Kudji's case was reported a year after Kilbane's article had appeared. The cases mentioned by Kilbane and neglected by Sargent are those of Stammler[11] and Kummel and Graff.[12] These two cases are the only ones in the literature of complete bilateral reduplication of pelves and ureters with bilateral ectopic openings. They were both treated by anastomosing the two pelves on the right side and ligating and resecting the supernumerary ureter below. On the left side, however, the supernumerary ureter was merely ligated and resected, the pelves being too small to admit of successful anastomosis. Juvara's case is unique in the literature in that a single pelvis was drained by a ureter which divided immediately into two branches, one of which opened ectopically. Here ligation of the offending branch was the only logical procedure. In 1923, Hunner[13] encountered and treated a case almost identical with the one herein reported. He did not publish this case, however, until 1928. This case was also missed by Sargent. Another case was added by Alt[4] in 1934 and our Case 3 makes a total of eight cases treated by this method, all with successful outcome. The record speaks for itself.

SUMMARY AND CONCLUSIONS

(1) Three cases of ureteral ectopia are reported.

(2) The literature is briefly reviewed and methods of treatment are discussed.

(3) One of the reported cases and seven others gathered from the literature have all been treated successfully by ligation and resection of the aberrant ureter in its abdominal portion.

(4) No other methods of treatment have met with equal success except nephrectomy and heminephrectomy.

(5) Ligation should be undertaken only in cases in which the offending ureter drains a small but uninfected kidney segment.

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DISCUSSION (*Abstract*)

Dr. Henry W. E. Walther, New Orleans, La.—In recent years the only interesting case of ectopic ureter that Dr. Willoughby and I have observed was a case of urethral implantation on the right side similar to the first two cases reported by Dr. Everett, with the added anomaly of displacement of the left ureter on the anterior vesical wall.

Mrs. L. R. first presented herself to us on October 10, 1935, complaining of very severe bladder irritation, fever 102, nauseated and unable to keep anything in her stomach for the past four days. Physical examination was essentially negative, except for some tenderness of the right lumbar region. A 'phthalein test for one hour was 65 per cent and blood chemistry normal. On cystoscopy, there was evidence of a normal trigone, but neither ureter could be visualized.

Indigo carmine was then given, and the blue appeared from a cleft in the anterior bladder wall at about 12:30 o'clock. We were unable to catheterize the ureter, which emptied superiorly, and an intravenous urogram was made to determine whether or not both kidneys were present. We felt that we might be dealing with congenital absence on the right side. The patient's symptoms were unimproved after five days, and a second cystoscopy was done. At this time a much more extensive examination under gas oxygen was made and the presence of a right ureteral orifice was found in the urethra just inside the urethral sphincter. The reason the right ureter was not observed at the first cystoscopy was that the instrument was not withdrawn completely into the urethra. As soon as this was done a fold was found and a catheter introduced to the right kidney, which contained pus and bacteria. A retrograde pyelogram revealed a normal kidney pelvis. With renal lavage the temperature dropped to normal. Following the catheterization of the ureter the patient's symptoms were immediately relieved and she left the hospital in forty-eight hours. She has perfect control of bladder and normal urine now, but remains under observation.

UTERINE BLEEDING, A GYNECOLOGICAL PROBLEM*

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Myomata of the uterus frequently cause bleeding before the menopause. Schmitz[1] found myoma to be the outstanding lesion in about 25 per cent of the cases. The bleeding most frequently occurred after the age of 36. About 50 per cent of myomata are accompanied by bleeding. A prolonged or profuse period with a 28-day cycle is the most common form of bleeding in intramural myomata. It results from interference with the normal contractility of the uterus and the pelvic hyperemia due to the tumor mass.

Uncomplicated retroversion and retroflexion may give rise to menorrhagia or irregular bleeding.

Granulosa cell tumors of the ovary caused uterine bleeding in 27 of 33 such cases reported by Robert Meyer.[2] In 27 cases of bleeding associated with granulosa cell tumors, Meyer found hyperplasia of the endometrium and hypertrophy of the uterus in all cases. He concludes as do Shroeder,[3] Neumann[4] and others that these changes are produced by increased follicular hormone from the pathologic granulosa cell growth.

Upon examination of 1,398 cases of vaginal hemorrhage in the premenopausal age, Keene[5] found malignant disease in 14 per cent. Of these cases of malignant bleeding about 75 per cent proved to be due to cervical carcinoma.

The type of bleeding is not characteristic, but may be an exaggeration and prolongation of the regular menses, spotting between periods or almost continuous bleeding. Functional bleeding may occur at or near the time of re-establishment of the cycle following the termination of pregnancy. More than 60 per cent of all cases of functional bleeding occur in premenopausal age when there is a gradual recession of ovarian function.

A careful physical examination should be made which may reveal stigmata of endocrinopathy such as abnormal secondary sex characteristics or faulty stature and fat distribution. These findings are more often associated with amenorrhea. An enlarged thyroid may be found with evidence of hypothyroidism. A roentgen ray of the sella turcica may show evidence of erosion by a pituitary adenoma.

The most characteristic pathology in functional bleeding is found upon examination of sections from the ovary and specimens of endometrial scrapings. Usually there is a definite correlation in the microscopic pictures of these tissues, first noted by Robert Shroeder[6] (1919).

The ovary shows a persistence of graafian follicles with follicular cysts which may at times be of appreciable size. There is an absence of recent corpora lutea.

Our knowledge as to the cause of functional uterine bleeding is still incomplete.

A stimulus comes to the ovary in the form of gonadotropic hormone which is the product of the basophilic cells of the anterior pituitary. This sex hormone stimulus continues after extrusion of the egg, which occurs about the fourteenth day of the cycle. Estrin is formed in even greater amounts than before and a second female sex hormone, progestin (Corner[7] and Allen[8]) is elaborated. This hormone is produced only after luteinization of the corpus luteum and induces the characteristic premenstrual changes in the endometrium. The work of Smith and Engle[9] (1929), Moore and Hisaw[10] and coworkers (1932) proved that the secretory activity of the anterior pituitary is inhibited by estrin at the height of its production.

According to Allen's[11] "estrin-deprivation" theory, the destruction of the premenstrual endometrium and the menstrual bleeding is due to this cyclic fall in the estrin level of the blood.

It is further observed that uterine bleeding may occur at times when there is a high level of estrogenic hormone in the blood (Engle,[12] Frank and Goldberger, Flauhman and others). Then again Corner,[13] Engle, Smith and Shelesnyak[14] have demonstrated that progestin may inhibit the bleeding, which results in monkeys from the cessation of injections of estrin.

Generally speaking, any period lasting more than eight days is abnormal and a blood loss sufficient to cause a secondary anemia is to be regarded as pathologic.[15]

There is one type of bleeding which usually means a particular lesion in cases of postmenopausal bleeding occurring with granulosa tumors of the ovary. This lesion may be benign

*Read in Section on Gynecology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

or malignant. The history is sometimes misleading in diagnosis. Very much depends on biopsy of vulval, vaginal and cervical lesions. When the source of bleeding is from the cervical canal or uterus, curettage is our mainstay.

The cervix is the source in over 50 per cent of all cases of postmenopausal bleeding, and in about a third it is caused by carcinoma.

Excluding obstetrical bleeding, the causes of uterine hemorrhage may be divided into two large groups, one organic and the other functional. The principal organic causes are as follows:

Uterine fibromyomata; adnexitis; ovarian cyst; cervical and uterine polyps; cancer of the cervix; cancer and sarcoma of the uterus; uterine retrodisplacement; endometriosis; erosion and endocervicitis; sloughing or subinvolution subsequent to cautery or surgical diathermy of the cervix; fibroid uterus; chronic endometritis; hyperplasia of the endometrium; pelvic tuberculosis; tuberculosis of the cervix; syphilis; purpura hemorrhagica and hypertension.

This is a long and imposing list of organic causes of pathological bleeding. In the average practice, they still account for only 50 per cent of the cases, the remaining 50 per cent having to be classified as functional.

Menorrhagia is usually indicative of less pronounced disease than metrorrhagia or irregular bleeding between periods.

Uterine malignancy typically occurs after the menopause and the passage of tissue shreds often accompanies the irregular bleeding.

An entirely negative speculum and bimanual examination of the cervix, uterus, adnexa and *cul-de-sac* suggests functional uterine bleeding as the diagnosis.

Simple hypertrophy of the endometrium and the rarer chronic endometritis may at times be diagnosable as an office procedure by endometrial biopsy, after the method of Burch and Novak.[16]

Lowenberg[17] calls attention to a micro-organism described as *Trichomonas vaginalis* as a cause of uterine bleeding in 5 such cases. He says that the warm, well diluted hanging drop preparation of the discharge has in each instance disclosed many active trichomonads and appropriate treatment has cured the bleeding and the leukorrhea.

Lowenberg further calls attention to the fact that insulin often delays the menstrual periods. Sufficient cases have been reported to warrant its continued trial.

Many patients with menorrhagia are anemic and have a lowered metabolic rate. Adequate treatment of these conditions will often affect favorably the bleeding.

Allen and Doisy[18] established the biologic test for the female sex hormone, Aschheim-Zondek[19] the pituitary hormone.

Even if it were possible to produce menstruation by the use of hormone preparations in all cases, it is questionable whether the constant injections necessary are justifiable. Occasionally a marked asthenia, hypothyroidism, or obesity is found to be the underlying cause of the amenorrhea.

(1) Of a consecutive series of 596 patients treated at the Free Hospital for women with abnormal uterine bleeding as one of their complaints, 293, or slightly less than 50 per cent, were found to have benign lesions at the first operation.[20]

(2) Six of these 293, or 2 per cent, were actually cases of carcinoma which were improperly diagnosed, thereby reducing the percentage of non-malignancy to 48 per cent.

If abnormal discharge occurs anywhere near the time of the menopause, older women will tell the patient that her irregularities are "nothing but the change of life," which is natural at her age and should cause no concern. No case of uterine bleeding should be attributed to the menopause until every other possible cause has been satisfactorily excluded.

Cancer about the vulva is more serious than is cancer of the uterus, because metastasis from the former site occurs quickly.

In adolescent or menarchal hemorrhages menstruation comes on for the first time and without any discoverable cause continues constantly for weeks and months. The loss of blood causes anemia, weakness, emaciation and arrested growth and development.

Undoubtedly, endocrine disturbances of one kind or another, dysfunction or malfunction, or disharmonious action play the chief role in many cases of troublesome uterine hemorrhage and menstrual irregularities.

Cancer can be excluded only by the microscope. Hyperplastic endometrium has often been found associated with cancer of the ovaries. Errors in diagnosis here are so serious and

fatal in their consequences that, in the language of Kelley,[21]

"the discovery or exclusion of malignancies becomes the most important objective in all examinations of tumors of the uterus, as well as in all protracted hemorrhages." "Every case of uterine hemorrhage is cancer until proven otherwise."

Menstruation is the only example of a normal physiologic hemorrhage that occurs in human beings. Since this is true, the laity is prone to attribute any bleeding, be it profuse, scanty, regular or irregular, to a perversion of a normal function. If menstruation were not familiar as a regularly recurring phenomenon, a show of blood would send the sufferer to her physician immediately.

It is important to know whether the bleeding is continuous, or is irregular or spotting in character, whether it is associated with pain, and if so, the character of pain.

The following classifications of causes is recommended by Curtis.[22] In this classification there are five general groups:

(1) Bleeding that results from pregnancy.

(2) Benign tumors of the uterus.

(3) Malignant tumors of the uterus.

(4) Functional bleeding.

(5) Other causes.

Unusual bleeding is the most outstanding symptom of female pelvic disease and often the longest neglected, and this in spite of the fact that every intelligent woman is possessed of knowledge concerning what constitutes her normal menstruation.[23]

The intimate circulation of the uterus constitutes a well arranged irrigation system designed to meet the needs of this highly organized muscular organ under varying conditions and especially to maintain the fertility of the mucosa. Without periodical flushing of the system, impregnated ova would be starved while trying to plant and dig themselves in on what would otherwise be comparatively avascular endometrium.

The early intramural fibroid very seldom affects bleeding.

A generally fibrotic uterus is like an old piece of elastic which has lost its power to "snap back." When menstruating its cavity is expanded and the cervical canal is more patent. It is firm and usually moderately enlarged. It is more frequently seen in women approaching the menopause.

It behooves us to have cancer in mind until a definite diagnosis is established and such delay may be dangerous.

The well established clinicopathologic entity, endometrial hyperplasia, may also properly be grouped under uterine bleeding.

Zondek[24] found that in the human ovary the follicular hormone occurred in greatest concentration in the corpus luteum shortly before menstruation. In view of the fact that the ovarian hormone obtained from large graafian follicles, corpora lutea and placentae from both human and lower animals had the power to produce estrus in spayed experimental animals, including the monkey, and premature sexual maturity (enlargement of uterus, canalization of the vagina and cornification of the vaginal epithelium) in immature animals (mice, rats), it was thought that the ovary produced only one hormone, namely, the follicular hormone.

Evans and coworkers[25] have shown that, while prolan and anterior pituitary transplants have about the same qualitative effect on the ovaries of immature animals, they are dissimilar in that prolan (the material in pregnancy urine) is embarrassed in its action on the hypophysectomized animal and is limited in the effect it can produce in the normal infantile animal.

Prolan is the name given by Zondek to a hormone found in the anterior pituitary and in the urine of pregnant women that will cause luteinization in the ovaries of infant mice.

Prolan is divided into two parts, prolan A and prolan B. Prolan A is believed to stimulate follicle ripening in the ovary and prolan B to cause luteinization in the ovary. The latter is responsible for the reaction in the ovaries known as the Aschheim-Zondek[26] test.

The lack of corpora lutea means a lack of progestin or corpus luteum hormone and therefore an absence of a proper premenstrual endometrium. Thus the menstrual cycle is incomplete and when bleeding takes place it is certainly not menstruation. The bleeding in these cases is considered to be due to a breakdown and sloughing of the thickened endometrium.

Benign uterine hemorrhages may be divided into three classes according to the ages of the patients:[27]

(1) The hemorrhages of adolescence and of young women; (2) the hemorrhages of middle life and of the menopause; and (3) the hemorrhages occurring after the menopause.

Several questions arise when one sees a patient with uterine bleeding:

(1) What is causing the bleeding? (2) What can be done to stop the bleeding?

CAUSES OF BLEEDING GIVEN BY CULLEN[28]

(A) Those dependent upon recent pregnancy.
  (1) Retained products of gestation.
  (2) Ectopic gestation.
(B) Those not dependent upon recent pregnancy.
  (1) Functional hemorrhage (hyperplasia of the endometrium).
  (2) Pelvic infection.
  (3) New growths.
    (a) Benign (fibromyomata, adenomyoma, endometrioma, polyps).
    (b) Malignant (carcinoma, sarcoma).

Oftentimes just a small fragment of membrane or placental tissue is enough to keep up bleeding for weeks when it is retained in the uterus. When the uterus does not completely empty itself within a reasonable time it should be packed with a strip of sterile gauze, aseptic precautions being taken. When this packing is removed 24 hours later frequently the remaining products of gestation come away with the packing. In some cases it is necessary to pack two or three times.

When the bleeding occurs near the menopause it is very important to look for cancer of the uterus.

Novak[29] and Cullen have shown that in this condition there is hyperplasia of the endometrium. Novak[30] states that corpora lutea are characteristically absent from the ovaries and that there is an increase in the process of follicular maturation and atresia in this condition of functional uterine bleeding.

Abnormal uterine bleeding occurs with great frequency in cases of pelvic infection. The bleeding is caused by ovarian disease.

Uterine curettage is dangerous and of no value in these cases, as the bleeding is due to ovarian disease.

The usual type of bleeding seen in fibroid tumors of the uterus is an increased and prolonged menstrual flow. Women over 50 years of age who menstruate regularly should be suspected of fibroid tumor.

The causes of uterine bleeding in women who are under 35 years of age of benign origin which if possible should be treated conservatively fall into two groups:[31]

(1) Those associated with recent pregnancy, and (2) those dependent on pregnancy.

In the former group we find:

(1) Retained fetal membrane; (2) hydatidiform mole; (3) tubal pregnancy; (4) pregnancy in one horn of a bicornuate uterus; (5) a group of entities having to do with abnormal placental conditions, viz., placenta previa, low implantation of the placenta and premature separation of the placenta.

In the latter group we see:

(1) Hemorrhage due to hormonal imbalance such as endometrial hyperplasia, irregular shedding of the endometrium and irregular ripening of the endometrium.

(2) Polypoid changes of the fundal or cervical mucosa.

(3) Myoma or adenomyoma uteri.

(4) Adnexal disease.

In a study of cases bleeding from the vagina after the menopause is frequently treated symptomatically and passed over as being of little or no significance. Kanter[32] analyzed the etiologic factors responsible for this type of bleeding in all the case records from the gynecological services of the Presbyterian and Cook County Hospitals for the year 1930. During that year 98 patients were admitted to these services with postmenopausal bleeding as part of or as the entire symptom-complex.

The age incidence of bleeding after the menopause reveals that the greatest number of the patients are between the ages of 50 and 60. Of the 98 cases studied, 58 fall into this class, one patient was under 50, 27 were between the ages of 61 and 70, while 12 were over 70. The youngest patient in this service was 48 years of age, while the oldest was 77.

There were four types of bleeding complained of by the patients, namely: bloody stained leukorrhea, spotting, moderate in amount, and profuse with sizable hemorrhage and passage of large clots.

The great majority of the patients in this group presented themselves for treatment within one year of the time of the onset of the bleeding. Only eleven histories in the entire group stated that the patients had been bleeding for over one year, while 53 of them were seen within the first six months after the symptom showed itself.

Causes of postmenopausal bleeding not ac-

tually encountered in this series but which must be looked for in a thorough examination of the pelvis are senile endometritis, simple cystadenoma of the ovary, sarcoma of the ovary, torsion of the pedicle of an ovarian cyst, pyometra, foreign body in the vagina or uterus and carcinoma of the fallopian tubes.

In many instances of irregular menses there is a primary endocrine dysfunction. This may be the explanation for the irregular periods in many of the patients with fibromyomas of the uterus.

The occurrence of uterine bleeding in the middle of the menstrual cycle at the time rupture of the follicle takes place has long been recognized. There are in this group women who state that they had a slight sanguinous discharge about one week after the termination of the regular menstrual period and lasting for from two to three days. It is probable that many patients who complain that their menses occur every two weeks also belong to "ovulation bleeding."

Patients first notice that their menstrual periods become more profuse or occur at shortened intervals, and this becomes intensified each month until the bleeding is continuous.

Dysfunctional uterine bleeding is thought to be due to the same factors that probably take part in the bleeding of menstruation, namely, some action of the anterior hypophysis on an endometrium that has been exposed to the secretion of the ripe ovarian follicle.[33] Unlike menstruation, however, it is thought to be similar to the bleeding of monkeys, which frequently is not associated with ovulation, nor formation of a corpus luteum, and proliferative changes in the endometrium.

The amenorrhea of pregnancy and possibly other amenorrheas are associated with persistence of a corpus luteum. Conversely, the ovaries of patients with dysfunctional flowing commonly fail to contain a corpus luteum. Menstruation has frequently been observed to start early following operative removal of an active corpus luteum. Experimentally, Smith and Engle[34] have recently demonstrated in monkeys that a potent iodized oil extract of corpora lutea inhibited the flowing that otherwise would have occurred consequent to the administration of hypophyseal extract and estrin followed by castration.

The hormone of the newly formed corpus luteum (corpus granulosum) alters the morphology of the endometrium and transforms it into a secretory organ in preparation for the nidation of the fertilized egg.

If from some defect in the motor impulse (located by Shroeder[35] in the germ plasm of the egg) ovulation does not take place, the graafian follicle persists and no corpus luteum (granulosum) is formed.

Graves[36] concluded that:

(1) Metrorrhagia is associated with complete absence or marked defectiveness of the corpus luteum.

(2) The bleeding of metrorrhagia is the result of localized necroses in a dysplastic endometrium.

(3) Typical dysfunctional metrorrhagia is almost constantly associated with endometrial dysplasia.

(4) Endometrial dysplasia is produced by the abnormal continuation of the unantagonized follicle hormone and is constantly associated with follicle cystosis.

(5) In periodic dysfunctional bleeding both the follicle and corpus luteum hormones are present, but in a state of physiologic imbalance.

(6) The bleeding of fibroid tumors (with exceptions noted) is dysfunctional in nature and is morphologically and physiologically identical with that from nonfibroid uteri.

(7) The specificity of the corpus luteum hormone in contrast to that of the follicle has been confirmed by Smith[37] first by a repetition of Corner's[38] work and secondly by the discovery of distinctive reactions in the blood chemistry of experimental animals under various sexual conditions.

Uterine bleeding should always be considered a symptom rather than a disease.

Hydatidiform mole or cystic degeneration of the chorionic villi is one of the causes of uterine bleeding associated with pregnancy. The cysts vary in size from a millet to a grape seed, and their structure is such that they spring one from the other. According to Kehrer,[39] it may be partial or total, depending upon whether a few chorionic villi, a few cotyledons or the whole chorionic membrane take part in the degenerative process.

In early carcinoma of the cervix, where sight and touch do not clarify the situation, removal of a piece of the cervix at the site of the questionable lesion and microscopic examination of the specimen is imperative.

When the Greeks first coined a name for menstruation they thought the cycle had to do with certain phases of the moon. In the present day the cyclic nature of this process has been given a quite different interpretation; present day physiologists base their explanation not upon the waxing and waning of the moon, but upon the ebb and flow of certain hormones.

In the past there has been a fundamental error as to the physiology of the uterus, believing that its purpose was to menstruate. The present day conception or the purpose of the uterus and the remaining pelvic organs is reproduction. Menstruation is usually an epiphenomenon. It occurs only when the real purpose of reproductive functions, pregnancy, has been thwarted. For that reason it is better to speak of the reproductive rather than the menstrual cycle.

Two inter-related groups of changes take place to complete the female reproductive cycle: (1) those occurring in the endocrine glands (chiefly pituitary and ovary); and (2) those occurring in the uterus (endometrium).

The anterior lobe hormones responsible for this are known as:

(1) The follicle stimulating hormone or factor (prolan A), and (2) the luteinizing hormone or factor (prolan B).

The follicle-stimulating factor or hormone causes the primordial follicle of the ovary to develop into a mature graafian follicle which discharges its ovum on or about the fourteenth day of the cycle (that is, fourteen days following the onset of menstruation).

The luteinizing hormone or factor then transforms the granulosa cells which line the collapsed follicle into a corpus luteum. As a result of this anterior lobe activation, the ovary in turn elaborated its own hormones: (1) theelin (follicular hormone, estrin, etc.) which causes the endometrium to grow or proliferate, and (2) progestin (progesteron, corpus luteum hormone) which causes the endometrial glands to secrete and, at the same time, transform the endometrial connective tissue (stroma) into decidua-like cells. These changes (proliferation, secretion, and decidual reaction) are essential for the implantation of the fertilized ovum, and, since they are designed for pregnancy, the endometrium at their culmination during the last week of the cycle, is said to be of the pregravid type.

With the withdrawal of ovarian hormones, the endometrium degenerates and is desquamated (menstruation) accompanied by the characteristic menstrual discharge of endometrial fragments and blood. Most endocrinologists regard menstruation as a pure "hormone withdrawal" phenomenon; others explain it on the basis of a "menstruation hormone;" still others have sought some hormonal activity on the part of the dying ovum itself.

With the beginning of menstruation a new cycle begins. A new graafian follicle is brought to maturity and in turn brings about new endometrial proliferation through the elaboration of theelin. A new ovum is discharged.

For the purpose of description the endometrial changes occurring during the reproductive cycle may be divided into four main phases:

(1) Postmenstrual phase is the phase of regeneration or repair in which the endometrial lining of the uterine cavity is replaced after menstruation. The repair process begins immediately after the beginning of menstruation, continues throughout the flow, and is nearly complete when the flow ceases at or about the fifth day. Biopsy of the endometrium at this time shows the repair process more advanced in some areas than in others. Presumably, areas which first undergo desquamation are the first to be restored.

The endometrium during this phase is extremely thin. The glands are short, tubular in form, vertical or sometimes parallel to the surface; they are derived from the basal layer of the endometrium (reserve layer) which is unaffected by the menstrual process. The surface of the endometrium is derived from the epithelium of the uterine glands which remain after desquamation. At the end of the menstrual flow the "resurfacing" process is quite complete.

(2) The second early proliferative stage merges with the preceding and consists essentially of growth of the endometrium. Its constituent elements (glands and connective tissue) increase in size and glands in number. In increasing in length the glands maintain their characteristic tubular form. Nuclei in the glandular epithelium and in the stroma show signs of this growth process in the appearance of mitotic figures. This phase is activated by the follicular hormone (theelin); it comprises usually the period between the fifth and the eleventh days of the cycle.

(3) The late proliferative stage is characterized by even more noticeable growth of the endo-

metrium, both in the size and number of its constituent elements. The tubular glands lengthen even more and become convoluted and tortuous. At about the fourteenth day of the cycle (the time when ovulation occurs and corpus luteum development begins) the nuclei of the glandular epithelium migrate toward the lumen side of the cell. This phase (presecretory) terminates at or about the twenty-first day of the cycle. It has been called the "interval" phase or resting phase. However, it is really a time of great activity.

(4) The pregravid stage is the final phase of the cycle. Two characteristic changes are noted: (1) the glands take on a cork-screw appearance and are in a state of active secretion, discharging their secretions into their lumina. (2) The upper layer of the endometrium becomes extremely dense, due to the formation of decidua-like cells. The connective tissue cells lose their spindle shape and become large and polygonal, their nuclei become pale-staining and vascular in form. The endometrium shows three distinct layers: a compact upper layer, a spongy middle layer, and a basal or inactive layer which does not participate in cyclic changes.

Quantitative or qualitative changes in the anterior lobe or ovarian hormones may easily change the menstrual rhythm, as well as the amount and duration of flow. Amenorrhea can be primary pituitary or ovarian deficiency, and determining which glands are at fault is not always easy. Selection of the proper endocrine product for substitution or stimulation therapy requires an accurate diagnosis.

Hyperplasia of the endometrium which is recognized by the so-called "Swiss-cheese pattern" (Novak) is a typical example. It represents excessive theelin stimulation of the endometrium and deficient corpus luteum activity. Patients with this type of ovarian dysfunction complain of alternating amenorrhea and profuse menstrual bleeding, the ovaries contain many cystic follicles and no corpora lutea. This clinical picture is observed commonly at the beginning of menstrual life (puberty) and near its close (menopause). Rational endocrine therapy for this condition demands the substitution of corpus luteum hormone (progestin) or the administration of the luteinizing hormone.

The following is a partial report of work done by a special study group from the Department of Gynecology, Hillman Hospital, Birmingham, Alabama, and I wish to express my genuine appreciation to Dr. Louis C. Posey, Pathologist, who has been associated with me in this work and has studied and reported on the endometrial findings of these cases.

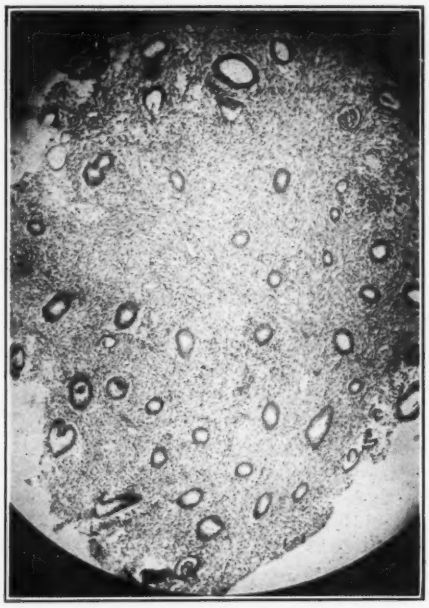

Fig. 1

(DP-37-6) Endometrium in early proliferative phase. The section shows compact stroma of small cells. Glands are small and their nuclei pseudostratified (magnification X 75).

Fig. 2

(G-37-837) Endometrium in early secretory phase. Note edema of the stroma and large tortuous glands. The epithelial nuclei of the glands are oval or rounded and show central alignment (magnification X 75).

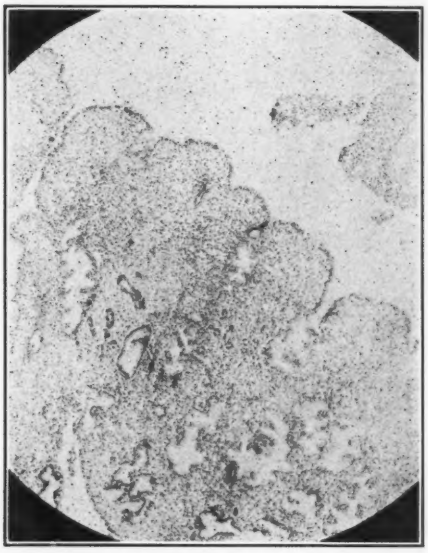

Fig. 3

(DP-37-10) Endometrium in premenstrual phase. Glands are more tortuous and are producing a secretion. There are nests of small blood vessels. The edema shown in Fig. 2 has been replaced by cytoplasmic enlargement of the stroma cells. In other words, actual decidua are formed (magnification X 75).

Fig. 5

(S-37-796) Endometrium in late proliferative phase. The glands are much more cystic than shown in Fig. 4 (magnification X 160).

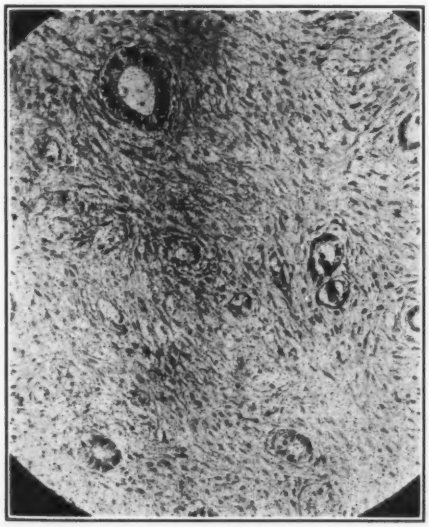

Fig. 4

(S-37-1000) Endometrium in early proliferative phase. The patient is 45 years old. Glands and stroma are poorly formed. An occasional gland is cystic (magnification X 160).

Fig. 6

(S-37-962) Endometrium in late secretory (corpus luteum) phase. Note the relatively thin solid stroma area near surface as contrasted with the thick zone shown in Fig. 3.

The last three figures, 4, 5 and 6, show phases of an endometrial cycle from a patient in early menopause who has a decreased ovarian function. She has had menorrhagia for one year.

The endometrial tissue was obtained with the Novak suction curet.

May I further thank Dr. George S. Graham and his entire laboratory staff for their untiring efforts; also Dr. J. W. MacQueen, Hospital Director, who made the work possible, physicians, Miss Brisbane and others who have referred these cases to us.

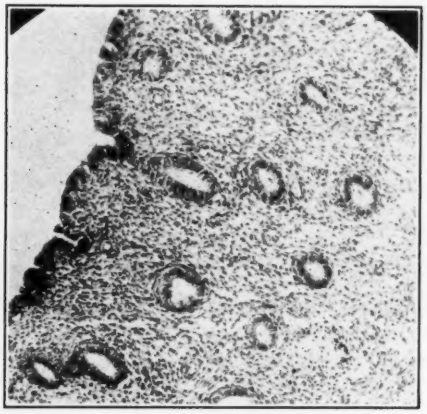

Fig. 7

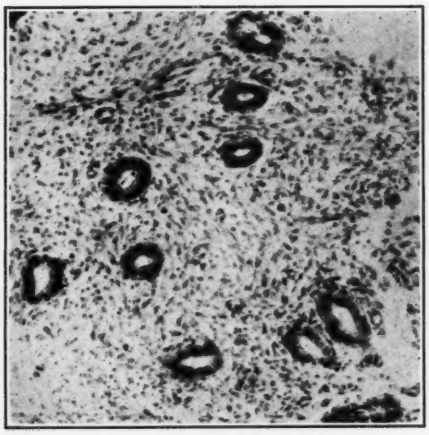

Fig. 8

(S-37-727 and S-37-771) Endometria removed 14 days apart. Actually there is very little difference in these sections. Both are in proliferative phases. The patient (37 years old) complained of menorrhagia (magnification X 160).

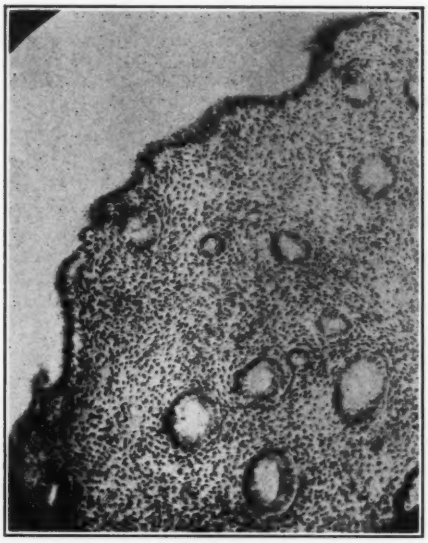

Fig. 9

(S-37-1001) Shows endometrium from the patient in Figs. 7 and 8 after fourteen daily injections of 1 c. c. of "antophysin." The endometrium is well formed and shows an early secretory phase. The patient is clinically cured (magnification X 160).

Fig. 10

(S-37-388) Shows endometrium from a 23-year-old patient who complained of menorrhagia and metrorrhagia of three years' duration. This specimen is in a late proliferative phase and contains cystic glands. Actually less than 0.5 gram of tissue could be obtained at biopsy (magnification X 75).

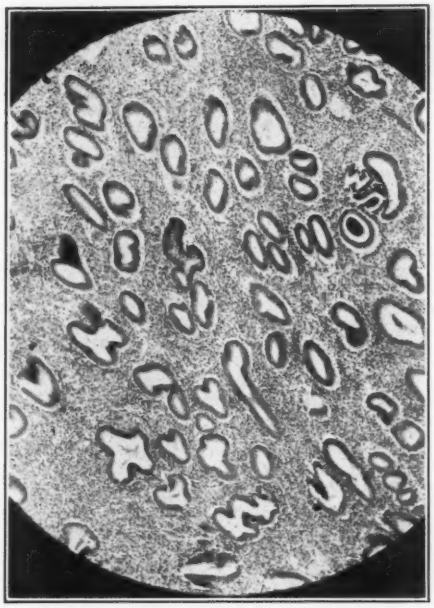

Fig. 11

(S-37-833) Shows endometrium of the patient in Fig. 10 taken as near the same period in her menstrual cycle as practicable after ten injections of 1 c. c. of "antophysin." Note the marked increase in the number and in the thickness of the glands per unit area. The patient is clinically improved, has left cystic ovary, but bleeding has been much less (magnification X 75).

SUMMARY

(1) Granulosa cell tumors of the ovary are quite frequent and with them one often finds bleeding associated with hyperplasia of the endometrium and hypertrophy of the uterus.

(2) A characteristic pathologic condition in functional bleeding is found upon examination of sections from the ovary and specimens of endometrial scrapings.

(3) A stimulus comes to the ovary in the form of gonadotropic hormone which is the product of the basophilic cells of the anterior pituitary.

(4) Menorrhagia is usually indicative of less pronounced disease than metrorrhagia or irregular bleeding between periods. Hypertrophy of the endometrium at times is diagnosable as an office procedure by endometrial biopsy, after the method of Burch and Novak.

(5) Cancer can be excluded only by the microscope. Hyperplastic endometrium has often been associated with cancer of the ovaries.

(6) Unusual bleeding is the most outstanding symptom of female pelvic disease and often the longest neglected.

(7) Prolan is divided into two parts: prolan A to stimulate follicle ripening in the ovary and prolan B to cause luteinization in the ovary.

(8) In irregular menses there is a primary endocrine dysfunction. This may be the explanation for the irregular periods in many patients with fibromyomas of the uterus.

(9) Dysfunctional uterine bleeding is believed to be due to some action of the anterior hypophysis on an endometrium that has been exposed to the secretion of the ripe ovarian follicle.

(10) The hormone of the newly formed corpus luteum (corpus granulosum) alters the morphology of the endometrium and transforms it into a secretory organ in preparation for the nidation of the fertilized egg.

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DISCUSSION (*Abstract*)

Dr. Conrad G. Collins, New Orleans, La.—In considering the treatment of uterine bleeding, we can roughly classify cases as those of endocrine origin and those due to local pathologic conditions.

In bleeding near puberty, we usually find a deficiency of the luteinizing hormone and a hyperplasia of the endometrium, although the latter is by no means a constant finding, as patients are known to bleed excessively from a normal endometrial pattern as well as from a hyperplastic endometrium, and even from an atrophic endometrium. Formerly, these cases were treated by repeated curettage, by fractional doses of radium or x-ray, and sometimes by hysterectomy. Today, with the advent of the luteinizing hormone, we are able to combat successfully the majority of the functional cases by the administration of 1 c. c. of the luteinizing hormone daily for 4 to 5 days, repeating this therapy every 24 days over a period of 4 to 5 months.

Secondary anemias, always a concomitant of the functional uterine bleeding of puberty and young women, are treated with hemopoietic stimulants. To know the basal metabolism is essential, and should the metabolic reading be low, thyroid is added to the therapeutic regime. This mode of treatment has practically eliminated the use of radium and hysterectomy in the young woman, as far as we are concerned; it has even eliminated the use of the curet, except in the occasional case. However, should curettage prove a necessity following it, a complete course of hormonal therapy is instituted.

At the menopause we do not advise the use of hormones to control bleeding, as they rarely prove successful, and we may overlook pathologic entities such as fibroids, or carcinoma of the fundus or cervix. We are adamant in our belief that in bleeding in a woman past the age of 40 years immediate curettage is imperative in order to ascertain the presence or absence of carcinoma. Uterine bleeding in the woman past the age of 40, irrespective of the type of pathologic condition found, be it carcinoma of the fundus or cervix, fibroids, hyperplasia of the endometrium, or fibrosis of the uterus, is treated by the use of radium or by hysterectomy, vaginal or abdominal, depending upon the associated disease, as cystocele, prolapse, cervicitis, and so on.

To repeat, we do not believe that hormonal therapy has any indication in the treatment of the woman past 40 years of age, unless it is the estrogenic hormone given to control menopausal symptoms. In carcinoma of the cervix, we use a heavy dose of radium, believing that surgery has no place in its treatment. Carcinoma of the fundus is best treated by hysterectomy, unless the tumor has progressed to stage 4 clinically. Then we prefer the use of radium.

Bleeding from incomplete abortion is treated with the utmost conservatism. Curettage and introduction of any instrument into the cavity of the uterus is condemned unless the patient is bleeding to an alarming degree and control is impossible by any other method. Then, and then only, do we resort to the curet. Patients who continue bleeding despite conservative treatment are curetted only after their temperature has been normal for a period of two weeks.

In cases of bleeding due to retrodisplacements, depending upon the age of the woman and the degree of fibrosis or subinvolution encountered, we use either curettage and suspension of the uterus or hysterectomy, but only after conservative methods have failed.

Dr. Douglas (closing).—Uterine bleeding is caused in many cases by endocrine disturbances, so if we do not find grossly sufficient disease about the cervix, fundus, tubes or ovaries to account for the symptoms, we should study completely the endocrine system.

Many cases of profuse or frequent bleeding are due to an excessive amount of follicle forming hormone, prolan A, or a deficient amount of luteinizing hormone, prolan B. An imbalance of these two antagonizing substances, if corrected, will correct the abnormal bleeding.

No case of abnormal bleeding should be treated until a satisfactory gynecologic examination has been done, for many of them are due to early malignancy which can be cured by early treatment.

Careful study of endometrial tissue gives a great deal of information, not only as to the presence of malignancy, but as to the development of the endometrium, amount of follicle forming hormones, the action of progestin, but also as to whether ovulation is taking place.

Endometrial biopsies can be obtained very easily by the punch or suction curet, as used by Burch or

Novak (I use the suction curet as a rule). An anesthetic is not necessary.

Biopsy can be repeated as often as desired, of course using aseptic precautions. Practically a complete curettage can be done with the suction curet.

The study of endometrial tissue can be very helpful in sterility cases, especially in attempting to determine whether ovulation is taking place.

If we devote more study to cases of abnormal bleeding, more correctly diagnosing them, less unwarranted surgery will be done. For if properly diagnosed many cases can be cured without radical surgery, radium or x-ray treatments.

DISEASES MISDIAGNOSED AS EARLY SYPHILIS*

By EWELL I. THOMPSON, M.D.†
Little Rock, Arkansas

Clinical literature records numerous instances of cases of syphilis which were not diagnosed. This may have been due to the lack of a complete examination or the unfamiliarity with the various manifestations of the disease. Very little mention has been made of that other group of individuals who were mistakenly treated for syphilis which they did not have. Many of these were treated because of the indefinite serological findings and the similarity of the clinical and physical findings with those of syphilis. A few have been treated because of the failure of many forms of treatment for the disease under consideration. Some have been treated because of the belief of a small number of physicians that shots are always timely and that even though they may do no good, they will do no harm. It is almost as great a crime to treat a patient for syphilis who does not have the disease as it is to fail to treat one who has it. Aside from the toxic effects of the drug administered the patient will most probably develop an attitude not conducive to future happiness.

Since the diagnosis of early syphilis is important for the protection of all, some of the diseases closely resembling it are both described and illustrated. Also a case of secondary syphilis of the discoid and annulopapular type easily confused with ringworm (tinea corporis) is illustrated.

SECONDARY SYPHILIS

This case was a colored man who had had a primary lesion on the genitalia. Three weeks later a secondary eruption of the discoid and annulopapular type appeared on the face. Mucous patches were present in the mouth and the Wassermann was four plus. The eruption consisted of indurated, non-scaly discoid and annulopapular lesions on the forehead. Shiny papules and nodules were symmetrically distributed over the body. The lesions varied from pea size to one and one-half centimeters in diameter and were accompanied by moderate itching. The trichophyton fungus could not be found.

This type of secondary eruption appears principally in the colored race. Due to its ring-like formation it may easily be confused with ringworm infection. Some of these cases have been treated for ringworm infection by physicians and indirectly by nurses, druggists and laymen. The lives of not one but many depend upon the diagnosis.

PITYRIASIS ROSEA

This case was a white woman, aged 48, with pityriasis rosea of two weeks' duration. The primary lesion began on the left breast as a small plaque which the patient thought was a ringworm patch. In three to four days papules and plaques appeared symmetrically over the body, principally the trunk. There was moderate pruritus. As the lesions enlarged they formed slightly infiltrated brownish to salmon colored plaques. The lesions were superficial, showed some furfuraceous scaling and followed the tension lines of the skin. The throat was a little red, but there was no evidence of ulcers. There were no lesions in the palms or on the soles. There was no history nor evidence of a chancre. The Wasser-

Fig. 1
Secondary syphilis (annulopapular).

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

†Associate Professor of Dermatology, University of Arkansas School of Medicine.

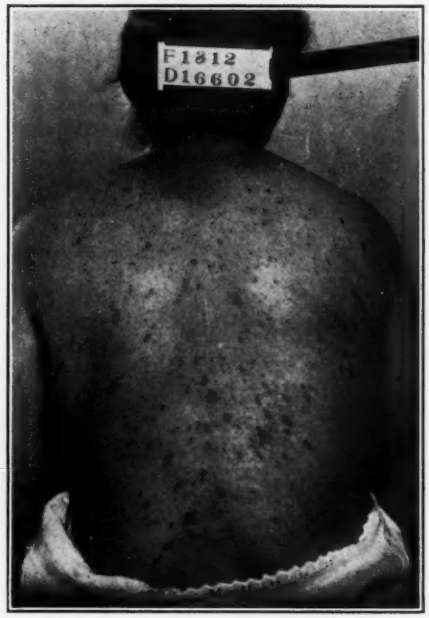

Fig. 2
Pityriasis rosea.

mann test was negative. This case received some antiluetic treatment. Since her cure followed her treatment, she had a phobia of syphilis for a long time.

MACULAR LEPROSY

This case was macular leprosy of one year's duration which had been diagnosed and treated as ringworm and syphilis. The eruption consisted of itching non-indurated varnish brown macules symmetrically distributed over the whole body. This eruption of one year's duration was accompanied by weakness, loss of weight, anorexia and by generalized adenopathy. If the eruption had been luetic the macules would not have persisted one year and would not have had an oily appearance. The lymph nodes were enlarged. There was no anesthesia, nodules, ulcers, atrophy, depigmentation nor loss of hair. The patient did not know of any exposure to leprosy. Antiluetic treatment had not produced any apparent change in his physical condition. The diagnosis of leprosy was confirmed by finding Hansen's bacilli in the nasal smears and biopsy examination.

GRANULOMA INGUINALE

This case was a colored woman, aged 24, who gave a history of a small nodule appearing on the left vulva. This nodule became larger and in about two weeks ulcerated. The ulceration spread toward the left groin and gradually coalesced with other nodules that had formed. The ulcers had a bluish granular appearance with advancing borders. The dark-field and Wassermann tests were negative. There was no history of headache, backache, alopecia or anorexia. No eruption was present on the remainder of the body. There were no mucous patches or condyloma. Although some antiluetic treatment had been given, the ulcers had increased in size. Donovan bodies were found in the smears and biopsy. The Frei test was negative. The ulcers healed following intramuscular injections of fuadin.

LYMPHOGRANULOMA INGUINALE

This patient is a white man with lymphogranuloma inguinale. A small ulcer appeared on the penis about three weeks after intercourse. In about two to three weeks he noted that the inguinal nodes were enlarged. He was given antiluetic treatment by a physician without improvement. The Wassermann and dark-field tests were negative, but the Frei test was positive.

This patient thought he had syphilis when the lesion appeared on the penis. The lesion disappeared while he was taking injections of arsphenamine. Although he was told later that all of his tests were negative for syphilis, he will go through life with a phobia of syphilis.

The Frei test is a great aid in the diagnosis of lymphogranuloma inguinale, but we must take into consideration that it may remain positive for many years after infection.

Fig. 3
Macular leprosy (without anesthesia).

Fig. 4
Macular leprosy (intracellular and extracellular bacilli).

Lymphogranuloma inguinale is not so rare as was formerly thought. It is seen quite frequently when one looks for it.

There are other conditions which practitioners are confusing with early syphilis because of location and the lack of a complete examination. These are scabies, herpes progenitalis and chancroid of the penis. Allergic dermatitis, drug eruptions and lichen planus might also be confusing. A more complete history and physical examination, coupled with microscopic and biopsy examinations, will help to differentiate the above from syphilis.

The student should be taught the various cutaneous manifestations of syphilis as well as the diseases closely resembling it. His early diagnosis will give the patient a better chance of cure as well as protect others during this most dangerous stage. We have spent too much time in the past trying to get a drug that would cure the patient quickly, at the expense of educating the student, patient and public. Some students have been graduated from our largest medical universities without seeing a chancre. Many patients have been treated by physicians without instructions as to how they should protect themselves and others. The patient in many cases has had no advice as to the meaning of his blood tests or the duration of treatment necessary.

Many of the most intelligent laymen who know all about world affairs know nothing about protecting themselves from syphilis, because we have failed to tell them how to do so. Why should not we teach them something about prophylaxis? This prophylactic should be marketed under the supervision of the American Medical Association. Every drug company should be allowed to use the same trade mark for this prophylactic.

Social service departments should follow early cases closely to see that they get treatment regularly and over a period of time. Many patients can be taught the nature of the disease and they will then not give false information to others.

The public should be taught that syphilis is a disease and not dirt and contamination. There is no reason why we should not discuss syphilis as often as we do tuberculosis. The public should be shown lantern slides picturing the spirocheta showing how it may start on other parts of the body besides the penis and how other lesions follow from the earliest to the latest stage.

We should impress upon dentists, druggists, chiropodists and beauty parlor operators the need for examination of suspicious skin lesions by a dermatologist. I have seen mucous patches treated by dentists for Vincent's infection, and secondary syphilis treated by beauty parlor operators for acne, by druggists for ringworm, and by chiropodists for corns and calluses. We can

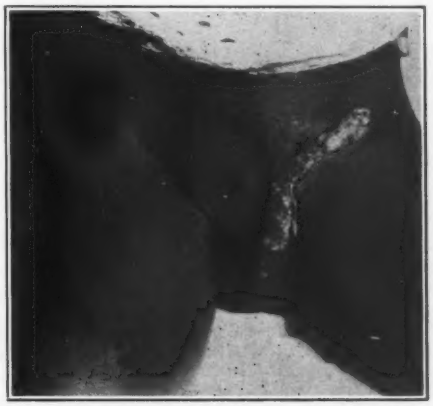

Fig. 5
Granuloma inguinale.

only progress in this field by better education of the student and public.

DISCUSSION (*Abstract*)

Dr. M. T. Van Studdiford, New Orleans, La.—Such papers as Dr. Thompson's will arouse the enthusiasm of the practitioner to acquaint himself better with the differential diagnosis. This paper points the way to better service to the patient.

Dr. Harry M. Robinson, Baltimore, Md.—I should like to discuss this paper from two points of view. First, those not trained in the differential diagnosis of skin conditions will quite naturally fail to diagnose many of the skin lesions that are syphilitic, and *vice versa*. A few years ago I heard a physician state that no case of pityriasis rosea should be diagnosed as such unless the serologic tests for syphilis were first performed and found negative. To the well trained dermatologist this is rarely necessary; not that the serologic tests for syphilis should not be performed when a patient has pityriasis rosea; on the contrary, they should be performed in the presence of any skin eruption or other illness in the hope of detecting the less evident cases of syphilis. Secondly, even those who are dermatologists occasionally fail to recognize syphilitic lesions and if serologic tests for syphilis are not done, the diagnosis may be missed. On the other hand, if the case is suspected of being syphilitic and the serum is negative, this usually rules out the diagnosis of syphilis.

My discussion, therefore, is a plea for the more frequent performance of serologic tests for syphilis whether one is trained in the differential diagnosis of skin conditions or not, and even if one is certain (clinically) that the case is syphilis.

Dr. Clinton W. Lane, St. Louis, Mo.—This paper of Dr. Thompson's coincides with national, state and local campaigns to acquaint the American public with many of the important phases of the syphilis problem. The aim of any campaign should be to decrease the incidence of this scourge, and a worthy educational program should have the active support of every physician. The doctor who will definitely acquaint himself with syphilis and its manifestations will be better qualified and equipped to aid in the campaign. The present paper, therefore, appears at a propitious time.

There has been too much discussion and quibbling in the past about which branch of medicine was best fitted to treat syphilis. Various groups, the internist, the neurologist, the dermatologist and the urologist, claim that they are the ones who should direct the type of therapy to be employed. Syphilis is a constitutional disease, so that the physician caring for the syphilitic should have a thorough knowledge of general medicine. A capable dermatologist must be well trained in internal medicine, for not only syphilis, but many of the other dermatoses are related to systemic disease. The earliest manifestations of syphilis are found on the skin, and the dermatologist is the best man to give an expert diagnostic opinion of the eruption. He, therefore, with his knowledge of skin manifestations and of general medicine, stands in the unique position of being a key man in the handling of the syphilis problem.

The numerous conditions with which syphilis may be confused have been emphasized in this paper. These diagnostic criteria should be stressed not only to medical students, but to the general practitioner, who after all is most often the first individual to see the early syphilitic patient. A good maxim is as follows: "Suspect every penile or external genital lesion, no matter how innocuous, as possible syphilis until proven otherwise, but do not treat as syphilis until the diagnosis has been definitely made." With present day improved transportation and excellent state, municipal and private laboratory facilities, the patient in the city and outlying districts can have the advantage of speedy microscopical and serological confirmation of a clinical diagnosis.

The genital eruptions, which are often misdiagnosed as syphilis have been enumerated. Of much greater difficulty is the diagnosis of the extragenital primary lesion. The indolent chancrous ulcer on the finger, considered to be a felon, and the lip chancre called a carbuncle or furuncle are too often treated surgically without any steps' being taken to obtain laboratory support of the diagnosis.

Errors in diagnosis are often more prevalent in the secondary than the primary stage of the disease. Syphilis is known as the great imitator, and may closely mimic other dermatoses. Five cardinal features of the rash of early syphilis should be emphasized, and the knowledge of them will help greatly in the prevention of diagnostic errors.

First, the outbreak tends to be generalized. It may not be universal, but it does involve many areas of the body, including the palms and the soles. The palmar and plantar surfaces are seldom the sites of an outbreak in the other conditions with which syphilis may be confused.

Second, the color is usually dull or coppery, or a raw ham red, in contradistinction to the bright or pinkish red of the confusing diseases. (The copper color is due to the plasma cell infiltration in the corium.)

Third, on account of the perivascular, cellular infiltration, there is a grouping of the lesions to form circles or arcs of circles.

Fourth, there is usually no pruritus. With the exception of the miliary, papular syphilide, itching is not often a prominent symptom, and in the small number of cases with pruritus, it is almost never of severe character.

Fifth, the secondary rash is usually accompanied by other signs of a subacute, general intoxication, such as dull headache, malaise, joint and muscle pains or soreness, pharyngitis and low-grade fever.

If the physician examining a suspect will keep in mind these five outstanding characteristics of the syphilitic eruption, the mistakes in diagnosis will be fewer in number.

Dr. Thompson's paper is valuable in emphasizing the eruptions, which at times closely resemble syphilis, and in warning us to be careful not to make the diagnosis of syphilis indiscriminately.

Dr. M. Toulmin Gaines, Mobile, Ala.—When I was in the army, stationed at Camp Sevier, South Carolina, there was a Major S. W. Schapira, of whom I knew nothing at the time but who, I have since learned from his obituary in the New York papers, was quite an

authority on syphilis. When my dermatologic diagnoses were questioned he was often called in consultation. He professed to know nothing of dermatology but said he did know what was syphilis and what was not. He would look at a case and say, "That is not syphilis. I do not know what it is, but it is not syphilis." His pronouncements were invariably correct.

This should be the attitude of the general practitioner. He need not be conversant with dermatology but he should know the general characteristics of syphilitic eruptions.

Dr. Thompson (closing).—My purpose in presenting this paper is to show the need of proper education of general practitioners, laymen and medical students regarding syphilis and the diseases closely resembling it. Many cases by proper education are preventable. Early diagnosis and treatment of the case will give a better chance of cure and will also protect others.

As members of the Section on Dermatology and Syphilology you can help the public health department in preventing, controlling and eliminating this disease.

THE CONTROL OF SYPHILIS IN THE SOUTHERN STATES*

By R. A. VONDERLEHR, M.D.†
Washington, District of Columbia

A municipal health department in one of the larger cities of the deep South, when in recent months a survey was performed by an officer of the Public Health Service, was found to have no venereal disease clinic whatever. A part-pay clinic, considered to be a reputable one, was operated in one of the larger local hospitals. In this, the only clinic in the city, the male patients during the year 1936 received an average of only two doses of arsphenamine per patient; the female patients four doses.

In commenting on the personnel in this venereal disease clinic the officer reported that two colored male attendants were allowed to draw blood for serologic tests on the male patients and also to treat them. The physician in charge of the clinic claimed that these attendants knew more than he did about the treatment of venereal diseases.

Does the attitude of the physician in charge of this clinic and the local health officer reflect the feeling of the medical profession? How numerous are clinics of this kind in the South and in other parts of the country? Can syphilis be controlled in the United States if such conditions exist generally? County medical societies and local health officers should be in a position to answer these questions. But let us study some of the facts which are available.

THE EXTENT OF SYPHILIS IN RURAL AND URBAN COMMUNITIES

Over the past decade the United States Public Health Service, in cooperation with medical societies, state and local health officers and the American Social Hygiene Association, has reported at regular intervals the number of syphilitic patients under treatment in individual Southern communities. A composite report of these surveys of all sources of treatment serving 6,000,000 of the population of the South representing 18 urban Southern communities, with a population ranging from 6,000 to 325,000, and 60 rural Southern communities reveal some of the deficiencies in the present treatment and control program for syphilis.

If the number of individuals actually under treatment for syphilis in the Southern states

Table 1

COMPARATIVE PREVALENCE RATE FOR SYPHILIS PER 100,000 POPULATION BASED ON REPRESENTATIVE URBAN AND RURAL AREAS OF THE SOUTH WITH THE REST OF THE UNITED STATES BY COLOR AND SEX OF PATIENT AND STAGE OF THE INFECTION

Color and Sex of Patient, and Stage of Infection	Rate per 100,000 Population			
	Urban		Rural	
	South	Rest of United States	South	Rest of United States
White males				
Total	806	404	205	154
Early	303	107	104	72
Late	503	297	101	82
White females				
Total	428	250	90	81
Early	134	61	39	31
Late	294	189	51	50
Total white	613	327	149	120
Colored males				
Total	1909	1332	511	360
Early	566	310	230	193
Late	1343	1022	281	167
Colored females				
Total	1590	1783	355	259
Early	282	387	136	72
Late	1308	1396	219	187
Total colored	1742	1539	433	311
Grand total	848	350	234	124

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

†Assistant Surgeon General, U. S. Public Health Service.

could be taken as an index to the actual frequency of the infection in rural and urban communities, it might be concluded that syphilis is a problem chiefly of urban areas. However, it is believed that the rates based on cases under treatment simply reflect the accessibility of treatment facilities. The Army during the last war reported that among the draftees syphilis was in the ratio of 89 to 100 for rural to urban areas.[1] Results of more recent serologic surveys of 27,000 rural Negroes of the South showed prevalence rates for syphilis much higher among those for whom no treatment facilities had been available preceding the serologic survey.[2] In urban areas of the South the rate for the colored population under treatment for syphilis does not greatly exceed that of urban areas in other parts of the United States (1,742 to 1,539 cases per 100,000 population). However, the prevalence rate for syphilis among the white population in the South is nearly twice that found in other parts of the country, 613 to 327 per 100,000 population.

The high ratio of 3 to 1 for the colored population of urban areas as contrasted with that of the white is obviously of greater significance in the South than elsewhere in the nation, because the largest proportion (78.7 per cent) of the Negro population resides in the South.[3]

Incidence.—Of the estimated 518,000 individuals[4] who acquire syphilis annually in the United States and seek authorized medical care, it is estimated that 334,000, or 65 per cent, are in the 16 Southern states and the District of Columbia. This estimate is based on 22 surveys in representative areas of the South, both urban and rural. They include the reports from all authorized sources of treatment providing medical care for 3,000,000 individuals. It is most significant that, although only 30 per cent of the population of this country reside in the Southern states, 65 per cent of all individuals in the United States who acquire syphilis each year are in this area.

Prevalence.—At first sight, a less serious situation appears to exist with regard to prevalence. Some 254,000, or 37 per cent, of the estimated 683,000 syphilis patients under observation and treatment are in these 16 Southern states and the District of Columbia. While the incidence rate for early syphilis is more than four times higher for the surveyed Southern localities than for the remaining surveyed areas of the country, the prevalence based upon these surveys of sources of treatment indicate that only about one-third of the 683,000 patients under treatment-observation at a given time are in the South. This relatively small number of patients under treatment-observation indicates that the treatment-observation period for the average patient in the South is much shorter than in other parts of the country and shows that treatment for syphilis throughout the South is not so adequate as elsewhere in the United States.

ADEQUACY OF PRESENT TREATMENT FACILITIES

In urban areas public clinics care for one-third to one-fourth of the white population under treatment for syphilis and approximately four-fifths of the Negroes, both in the South and in the remaining parts of the nation. The great difference in availability of public clinic care for the medically indigent occurs in rural areas, especially among Negroes. In the South less than one-fourth of the rural Negroes under treatment for syphilis are in the public clinics, as contrasted with one-half of rural Negroes in other parts of the country. This evidence exists in spite of the fact that the Southern rural Negro has a much lower income.

Table 2

PERCENTAGE OF SYPHILIS PATIENTS ACTUALLY UNDER TREATMENT IN PUBLIC CLINICS IN THE SOUTH AS CONTRASTED WITH THOSE IN OTHER AREAS OF THE UNITED STATES

Color and Sex	Urban		Rural		Total	
	South	Other Areas of United States	South	Other Areas of United States	South	Other Areas of United States
White	36.4	40.2	18.4	11.8	34.4	38.4
Colored	78.7	83.8	23.1	51.7	69.1	82.4
Total	54.5	43.8	21.0	14.2	49.9	42.0

Do available facilities meet the present need for effective control of syphilis through treatment. Definitely no! The overcrowded syphilis clinics are largely responsible for the failure of those infected to remain under treatment for a sufficient time to receive the maximum benefit of therapy. At present there are 254,000 persons in the Southern states constantly receiving medical care for syphilis, and annually 627,000 patients with syphilis in all stages come under treatment for the first time. The Cooperative Clinical Group agrees that the optimum average duration of treatment for early and late syphilis averages about two years. If treatment were

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administered on this basis there would be at any one time with the present need, one and a quarter million persons with syphilis under treatment in these states. Yet, present medical facilities in the South provide care for only 254,000 of the one and a quarter million patients, or 20 per cent of the actual medical care needed for the effective control of syphilis.

NEED FOR EDUCATION OF INFECTED INDIVIDUALS

Throughout the United States there is not only a vast army of syphilitic patients who are inadequately or improperly treated, but also a very large group which remains entirely untreated until some late manifestation of syphilis causes them to seek medical attention.

Several factors operate to cause this condition to remain unchanged, one of which is the need for educational work among those infected. Such work should emphasize the seriousness of the infection, the promise of "cure" obtainable through adequate treatment of early syphilis by skilled clinicians, and the dangers and disability resulting from inadequate, haphazard or self-treatment.

Evidence of this lack of understanding on the part of infected individuals, especially in urban centers of the South, is found in a report by the American Social Hygiene Association. The report is a summary of replies by 2,700 unselected young men in eight communities to questions asked them as to what to do for syphilis or gonorrhea. The replies of the young men residing in Birmingham, Dallas, and New Orleans showed that the need for education in these centers was nearly twice that found in other metropolitan areas where similar surveys were made, namely, San Francisco, Chicago, and Washington, District of Columbia.

This neglect of early treatment is reflected in the South by the fact that of the 627,000 first admissions for syphilis each year 290,000 delayed seeking authorized medical care until after the infection had progressed beyond the early stage.

ACTION BY THE HEALTH DEPARTMENT AND THE MEDICAL PROFESSION NECESSARY

It is well known that united action by the medical profession and health department is necessary for the control of syphilis. Data are available which indicate the extent of interest in syphilis control in the Southern states.

Health Departments.—Recently through the use of a simple questionnaire, information has been sought from state health departments indicating the measures which had been adopted in the control of syphilis in the sixteen Southern states and the District of Columbia on July 1, 1937. Reports have been received from all of these health departments. Among them, nine have a separate division of venereal disease control and 11 have full-time venereal disease control officers. In 3 state departments of health, the venereal disease control officer has a full-time assistant.

Provisions for the treatment of syphilitic patients are of interest. Of the 1,250 venereal disease clinics known to be situated in the United States, 445, or 35.6 per cent, were in Southern states. Two of the state departments of health reported that they were furnishing free anti-syphilitic drugs for the treatment of all syphilitic persons regardless of their economic status, and 11 additional states were furnishing such drugs for the treatment of medically indigent patients only.

A system of direct dark-field examinations was offered by the state department of health laboratory to clinics in 9 Southern states and the District of Columbia, and to private physicians by 10 states. A delayed system of dark-field examination was offered by the state laboratories both to clinics and physicians in 10 states and the District of Columbia.

Free serodiagnostic tests for syphilis are performed in all of the laboratories of the state departments of health. The present efficiency of the performance of serodiagnostic tests is well known. In the evaluation of the performance of such tests in state laboratories completed in the spring of 1937 by the Committee on Evaluation of Serodiagnostic Tests for Syphilis, 15 states in the South (all except Florida) and the District of Columbia participated.[5] The directors of all of the Southern state laboratories have expressed a desire to take part in the projected evaluation plans which have been made for the coming winter.

The three laboratories with the poorest serologic ratings in the study of last winter were Southern laboratories. The alarmingly high percentage of false positive reactions obtained with, and the exceedingly low percentage of syphilitic patients detected by some serologic tests performed in the laboratories of the South, indicate a great need for general improvement in serologic technic. To bring about this improvement physicians and health officers must insist that the efficiency of the performance of serodiagnostic

tests be checked periodically both clinically and on a comparative serologic basis.

In the important matter of case finding and case holding the Southern state departments of health report the following information. In two states, Kentucky and Maryland, full-time medical follow-up workers are provided for case finding duty, and in six additional states, Florida, Louisiana, Mississippi, Missouri, Tennessee and Virginia, part-time workers are available for clinic cases. Two Southern state departments of health (Kentucky and Maryland) provide full-time, and five (Florida, Louisiana, Mississippi, Tennessee and Virginia) provide part-time medical follow-up workers for case finding duty in clinics, and the Kentucky and Oklahoma state departments of health provide full-time, and Louisiana, Mississippi, Tennessee and Virginia provide part-time workers for case finding among the patients of private physicians.

The amount of money budgeted by the Southern state departments of health for direct expenditure in the control of venereal diseases is approximately $475,000 at the present time. These health departments estimate that approximately $500,000 is expended for the provision of diagnostic facilities in the venereal disease control program of state laboratories. One hesitates to accept this figure as final, however, because a single state (Oklahoma) reports the expenditure of $285,000 for laboratory work. If these totals are accepted, they represent an expenditure of slightly less than a million dollars in the 16 Southern states and the District of Columbia, or approximately 2.4 cents per person.

CONCLUSIONS

(1) There are at least four times as many patients in the South as in other parts of the United States who seek treatment for syphilis.

(2) The proportion of untreated syphilis in the Southern states is even higher than four to one.

(3) The evidence available indicates that present medical and health services in the South provide only 20 per cent of the care needed for the effective control of syphilis.

(4) Facilities so far developed by state and local health departments are wholly inadequate to bring syphilis under control.

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PROGRESS IN SYPHILIS CONTROL IN THE SOUTHERN STATES*

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This progress report on syphilis control in the Southern states is based mainly on information obtained directly from the state health authorities,[1] together with information tabulated from a questionnaire prepared by the Surgeon General on July 16, 1937.

Since February 1, 1936, when funds became available for cooperative health work with the states under Title VI of the Social Security Act, considerable progress has been made in the development of venereal disease control programs in the United States.[2] There has been increased sentiment due to splendid educational activities, personnel has been trained, improved laboratory facilities have been provided and increased appropriations made by state and local authorities specifically for this program. Physicians have been trained in clinical management of syphilis and are responding admirably by actual participation and leadership in this program. Lay groups are being educated and the general response is excellent. All the Southern states except one have definitely allotted funds for venereal disease control. These funds vary from $7,500 per annum in Texas to $65,000 per annum in Virginia. The total for the group of states is estimated to be $477,619, or an average of $29,851 per state per annum.

Alabama and Maryland are conspicuous in their activities in that they furnish free drugs for the treatment of syphilis to all patients, regardless of the economic status of the individual. The remaining states furnish free drugs for the treatment of the indigent. Nine of the group,

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*Read in Section on Public Health, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

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Alabama, the District of Columbia, Georgia, Kentucky, Louisiana, Oklahoma, Texas, Virginia and West Virginia, have separate divisions for venereal disease control activities, and eleven of the group have full-time venereal disease control officers. Three states have provided assistant venereal disease control officers. On account of the availability of training funds and facilities practically all of the venereal disease control officers have had experience and most of them have had special training in syphilis control.

ALABAMA

The Alabama Health Department has a separate division of venereal disease control with a full-time venereal disease control officer and one assistant. Since June 15, 1937, the Department has furnished free drugs for the treatment of syphilis for all persons, regardless of their economic status. Dark-field examinations are made free in the State laboratory, both for the clinics and the private physicians, and free serodiagnostic tests are performed in the State laboratory. The Department operates with three types of clinics:

(1) Four clinics operated by the county, or city, or both.

(2) Thirteen clinics operated by county health officers.

(3) Eighteen clinics operated by the county medical society.

Each patient must pay a small fee, which varies up to 50 cents.

At the beginning of the year, only sixteen counties had clinics to treat indigent patients for syphilis. Nineteen additional counties since then have added clinics. At least fifteen physicians who are interested in clinical syphilis management have been given refresher courses at Hot Springs, Arkansas. The Kolmer and Kahn tests are routine in the State laboratory. A committee on postgraduate study of the State Medical Society for the past two years has taken the control of syphilis as a major activity. Lay groups are becoming interested. The usual list of pamphlets and other educational material, films, and so on, are available. There has been a tremendous increase during the last twelve months in a constructive syphilis control program. The Department budgeted $54,395.36 for direct expenditures in the control of venereal diseases, and it is estimated that at least $25,000 is being spent in the State laboratory for diagnostic methods in the control of the disease.

ARKANSAS

There are at present seventeen county or district full-time health officers conducting regular clinics for the treatment of syphilis in Arkansas. The Public Health Service Clinic, the Levy Memorial Clinic at Hot Springs, the Isaac Folsom Clinic at the Arkansas Medical School, Little Rock, and the clinic of the Cotton Belt Railway at Texarkana are the principal clinics. The health department does not have a separate division of venereal disease control. This activity is under the direction of a well trained epidemiologist. The department furnishes free drugs for the treatment of indigent persons, only. Neither dark-field nor delayed dark-field examinations are made free in the State laboratory. Free serodiagnostic tests for syphilis are performed in the State laboratory for anyone. The health departments, both State and local, conduct educational campaigns through the distribution of literature, motion pictures and the usual literature on syphilis control.

The sum budgeted by the Department for direct expenditures for the control of venereal diseases for the present year is $16,550, and it is estimated that $4,025 is being spent at the State laboratory for diagnostic methods for the control of the disease.

DISTRICT OF COLUMBIA

The Health Department of the District has a separate division of venereal disease control with a part-time venereal disease control officer and the Department furnishes free drugs for the treatment of syphilis and gonorrhea for indigent patients only. Dark-field examinations are made free in the State laboratory for clinics, but not for private physicians. However, free serodiagnostic tests for syphilis are available in the State laboratory. The Department provides aid in case finding and case holding clinics and employs two social workers for that activity. Approximately twenty-five hundred new cases were brought to treatment during the year ending June 30, 1937.

The sum budgeted by the Department for the District for direct expenditures in the control of venereal diseases is estimated to be $21,870 and $15,870 was expended in the State laboratory for diagnostic methods in an effort to control this disease.

FLORIDA

The Bureau of Epidemiology of the Florida State Board of Health has charge of the venereal

disease control work. A division of Venereal Disease Control is in process of organization. Clinics are operated by several of the county health departments with the cooperation of the State Board of Health. Local health departments are stressing the health education angle of this problem through the medium of newspapers, radio and lectures. Free clinics are also operated in several of the larger cities of the State.

Neoarsphenamine is furnished free of charge to physicians for the free treatment of indigent cases of syphilis. No drugs are furnished for the treatment of gonorrhea.

The State laboratory performs the Kahn test free of charge for physicians. Microscopic examination for the gonococcus is made.

A State law requires reporting. Reports are made to the local health officer if on full time, otherwise to the State Department of Health. Usually name and residence of the patient is given; occasionally a case is reported by number. Effort is made to encourage physicians to report deaths due to syphilis or gonorrhea as such. Sources of infection are rarely traced; if it is necessary this is done by the local health officer.

The Bureau of Health Education has for distribution a number of newly revised pamphlets. This Bureau cooperates with other bureaus in the use of newspaper articles, lectures and radio.

GEORGIA

Georgia has a full-time venereal disease control officer and a full-time assistant. At least nine thousand reprints from the Survey Graphic article by Parran were distributed throughout the State. Over five thousand posters regarding syphilis have been posted in public places. In January, 1937, fifteen clinics were in operation and at present thirty-four counties have at least one clinic and some counties have more than one. In the unorganized counties arrangements are being made for the treatment of the indigent through cooperation between the State Health Department, County Board of Health and private physicians. The physicians are being paid by the county. The Wassermann and Kahn tests are free and used routinely. Nearly twelve thousand were made during the last fiscal year. Arsenicals and bismuth preparations are supplied all physicians at cost. Both dark-field and delayed dark-field examinations are available free.

There is a State law requiring reporting by serial number.

It is estimated that $54,079 has been budgeted for direct expenditure in the control of venereal diseases and that $28,200 will be expended during this year in the State laboratory for diagnostic methods in the control of venereal diseases.

KENTUCKY

There is a separate division of venereal disease control with a full-time medical officer in charge, but no assistant venereal disease control officer in Kentucky. The Department furnishes free drugs for the treatment of syphilis and gonorrhea for the indigent only. The dark-field examinations are made free in the State laboratory, both for physicians and cooperative clinics. Free serodiagnostic tests for syphilis are performed by the State laboratory. In view of Kentucky's splendid organization with eighty or more full-time county health departments, it is estimated that all of these departments conduct venereal disease control programs, either through cooperative medical society arrangements or with the county health officer as a clinician. In some instances a fee is charged as agreed to by the county medical society. It is estimated that there is at least one venereal disease clinic for every county health department. All of the epidemiological investigations are being made by the local health departments.

With the beginning of the current year an intensive cooperative campaign for the control of syphilis in this country was inaugurated by the United States Public Health Service, the various State and local health departments and the medical profession. Already this campaign is beginning to show results. Comparing the last six months of 1936 with the first six months of 1937, we find in Kentucky:

	1936	1937
New cases syphilis	2,935	5,481
Number of treatments (in office)	24,077	47,574
Blood tests for syphilis	11,013	23,311

These figures include only the work done by health departments. While no definite data are available at this time, it is safe to assume that private practitioners are treating more cases of syphilis today than they ever did before. The important point is that about twice as much syphilis was found and treated during the first six months of 1937 as in the last six months of 1936.

The sum budgeted by the Department for direct expenditure in the control of venereal dis-

eases for the present year is $45,717 and $37,000 will be spent in the State laboratory for diagnostic methods for the control of venereal diseases.

LOUISIANA

The syphilis control program for the State of Louisiana is directed by a full-time venereal disease control officer in a separate division of venereal disease control. Fourteen cooperative clinics in twelve parishes are now being operated for indigent patients only. Free drugs for the treatment of syphilis are supplied to any physician in the State for the treatment of the indigent on proper certification to the State Health Department. Dark-field examinations are made free in the State laboratory, both for the clinics and the private physicians, but not in the four branch State laboratories. Free serodiagnostic tests are performed in the State laboratory for anyone.

It is estimated that at least $15,630 have been budgeted for direct expenditures in the control of venereal disease for the present year, and that at least $5,000 will be expended in the State laboratory for diagnostic methods pertaining to venereal disease control. The State Health Department definitely plans to increase its cooperation with the medical society and the full-time parish health organization.

MARYLAND

A Division of Venereal Diseases has been created in the Bureau of Communicable Diseases of the State Department of Health.

All State-operated or subsidized clinics have been inspected and approved. Uniform records and standards for the admission of patients and uniform methods of treatment have been adopted.

Provision has been made at the Johns Hopkins Hospital for the training in syphilis control work of physicians from any part of the country.

A program has been developed to extend treatment as far as possible to all persons infected with venereal diseases. This program includes free distribution of arsenicals and other remedies to all physicians in the State for the treatment of their cases.

The State Department of Health operates clinics for the treatment of cases referred by physicians. At the present time there are fifty-two clinics being operated in the State, forty-two in the counties and ten in Baltimore City, where free treatment for syphilis and gonorrhea is given. Eleven new clinics have been established this year.

Efforts are made to find sources of infection. Family and other contacts are examined under the direction of the local health officer. When the patient goes from one clinic to another, reports are exchanged between the two clinics.

A State law requires reporting. Cases are reportable by name, patient and residence through the local health officer to the State Department of Health. Names of patients discontinuing treatment while still infectious are available to the health authorities. Efforts are made to persuade physicians to report deaths due to syphilis and gonorrhea as such.

The State laboratory has performed the Kline exclusion test on all specimens of blood since January 1, 1936. All specimens negative to this test are reported out on this basis. All specimens either positive or doubtful to the Kline exclusion test are examined by the standard Kahn and Kolmer tests and reported out only on the basis of the latter two tests.

The Hinton test is now being studied as a substitute for the Kolmer test. Tests used for diagnosis of gonorrhea are the microscopic examination for gonococcus, and the complement-fixation and culture tests when aked for. Culture test is available for the diagnosis of chancroid. Laboratory services are free to all physicians.

The following pamphlets, which are prepared by the United States Public Health Service, are distributed: (1) Sex Education in the Schools; (2) Sex Education in the Home; (3) Wonderful Story of Life; (4) Healthy, Happy Womanhood; (5) Manpower; (6) Keeping Fit.

Lantern slides and motion picture films are available for the use of physicians and educators. Some lectures are given to high school groups and teachers, and pamphlets are supplied on request.

MISSISSIPPI

Venereal disease control activities are under the direction of the Bureau of Epidemiology and county health work. There is no separate division of venereal disease control. The Department furnishes free drugs for the treatment of syphilis for indigent only, and for the treatment of the indigent in gonorrhea only at the clinics. The dark-field examinations are made free in the State laboratory for clinics and private physicians. Free serodiagnostic tests for syphilis are performed in the State laboratory.

It is estimated that the Department will spend approximately $11,500 for the control of vene-

real diseases and at least $6,000 will be spent in the State laboratory for diagnostic purposes. All clinical services are rendered by practicing physicians. At present there are about fifteen counties where such arrangements have been developed with the physicians and in one county one of the largest cotton planters in the State is cooperating in establishing facilities for the examination of approximately two thousand tenants.

There is a State law requiring reporting. A splendid educational program is conducted throughout the State, but is far more effective in those counties with full-time health service.

MISSOURI

The Department does not have a separate division of venereal disease control, but has provided for a full-time control officer. Administratively this work is directed from the Division of Local Health Administration, the director being assistant commissioner. Free drugs are distributed for the indigent, only, upon request of the physician, provided (a) that the case has been reported by age, color, sex, marital status, address and stage of the disease; (b) that the date of primary infection is shown on the report (no antisyphilitic drugs will be supplied where the primary infection was received more than two years previously); and (c) the treatment scheme must follow suggestions of the cooperative clinics (twenty arsenicals, twenty heavy metals with no rest periods as a minimum control treatment, regardless of the Wassermann reaction). Antisyphilitic drugs are also supplied to the local (county-district) health departments for maintaining free clinics on the three rules given. Free clinics for the treatment of syphilis are located in Columbia, Kansas City, Hannibal, St. Louis, Springfield and St. Joseph. The medication for these clinics is furnished locally. The State Health Department laboratory will furnish free serodiagnostic tests to physicians. Reporting of venereal diseases has been greatly increased since the first of this year in Missouri. Practically 50 per cent of this increase in the reporting of syphilis has been due to the rigid rules laid down by the Department as relating to laboratory and free arsenicals, together with the increased emphasis in its various educational ramifications. During the quarter ending in March of this year, 1,054 new cases of syphilis were reported, whereas in the quarter ending in September of this year, 2,287 cases were reported, or an increase of nearly 117 per cent. It is estimated that $9,000 has been budgeted by the Department for direct expenditures in the control of venereal diseases and that at least $14,000 will be expended by the State laboratory for diagnostic methods in the control of the disease.

NORTH CAROLINA

The venereal disease control program in North Carolina actually began functioning in October, 1936, at which time a full-time venereal disease consultant was employed. An educational campaign was the first activity. From October 1, 1936, to July 1, 1937, the venereal disease consultant appeared before approximately fifty thousand persons, about three-fifths of whom were boys and girls of high school age. Following this a State-wide series of conferences with high school teachers was inaugurated. Approximately sixteen hundred teachers were contacted in the interest of venereal disease control. In March, 1937, a copy of the Public Health Service reprint, "Standard Treatment Procedure in Early Syphilis," was mailed to every physician practicing in North Carolina. The full-time venereal disease control officer was provided with a year's study leave at Hopkins. There are now eighty-six venereal disease clinics in North Carolina which are operated by local health departments. These clinics conduct one hundred and twenty-nine sessions per week (each clinic day is considered a separate session). Of the State's one hundred counties, forty-three do not have clinic facilities. Drugs for the treatment of venereal diseases are available for free distribution to the local health departments. The only appropriation for venereal disease control in North Carolina amounts to $25,000, $10,000 of which may be used for the purchase of drugs. For the first ten months of 1936 there were reported in North Carolina, by case card reports, nearly five thousand cases of syphilis. For the same period of 1937, this has been more than doubled. Direct dark-field and delayed dark-field examinations are made free in the State laboratory, both for clinics and private physicians. Free serodiagnostic tests for syphilis are performed by the State laboratory.

It is estimated that at least $25,000 will be expended in the present year in the State laboratory for diagnostic methods pertaining to the control of syphilis.

OKLAHOMA

The Bureau of Venereal Disease Control of Oklahoma consists of a director, two nurses and three investigators or contact men, full time.

There is a separate division of venereal disease control with no assistant. Practically all of the venereal disease control activities in Oklahoma began with the availability of funds through the Social Security Act, February 1, 1936. The director of the division and the commissioner of health contacted every county medical society in the State for the purpose of explaining the program as well as to secure cooperation from every physician in the treatment of venereal diseases, regardless of economic status. At least seventeen hundred doctors were contacted and it was found that these physicians were already treating practically twenty thousand cases of syphilis and that at least eleven thousand of these cases were able to pay a full or part of a fee. From January 1, 1936, to December 31, 1936, there were reported to the State Health Department 1,828 cases of gonorrhea and 2,331 cases of syphilis, whereas from January 1, 1937, to September 30, 1937, there were reported 2,919 cases of gonorrhea and 4,218 cases of syphilis. Arsenicals for the treatment of syphilis are furnished free for the indigent and semi-indigent, provided the physician makes proper application and assures the Department that adequate treatment will be provided. The State Department is endeavoring to have all cases treated by private physicians. In Oklahoma County all cases are treated by private physicians through the medical Social Service Bureau. This Bureau acts as a clearing house for all indigent cases. The patient must pay 25 cents or more per treatment through a physician of his own choice. This Bureau is maintained by the county and not the State. The State does furnish arsenicals and assist in locating delinquent cases. The State Health Department maintains four laboratories and free serodiagnostic tests for syphilis are performed.

It is estimated that $10,000 has been budgeted for direct expenditures in the control of venereal diseases.

SOUTH CAROLINA

As of January, 1937, a definite Division of Syphilis Control was established, consisting of a full-time director and one clerk.

1. *Set-up.*—A separate Division of Syphilis Control, consisting of one full-time director and one clerk, acting under the guidance of a committee of five practicing physicians appointed by the president of the State Medical Association.

2. *Extent.*—Work is confined exclusively to syphilis control.

3. The division operates under a definite program bearing the endorsement of the State Medical Association.

4. *Clinics.*—Six urban clinics operating under local control, and supplied with limited follow-up service.

Approximately thirty rural and semi-rural clinics operated by local county health departments, only where requested by or with the consent of the local practicing profession. Follow-up service is very inadequate, due to the lack of personnel, the work being done by a limited generalized nursing service.

5. *Drugs.*—There is no free distribution, funds for the purpose being inavailable. However, the State Board of Health furnishes arsenicals and bismuth at minimum cost.

6. *Diagnostic Facilities.*—Practically all diagnostic work is performed by the State hygienic laboratory and is free to all physicians. Wassermann and Kahn tests are employed, as well as dark-field examinations. For the latter purpose, outfits for delayed study are distributed by the laboratory to physicians throughout the State.

7. *Education.*—No opportunity is lost for talks before professional and lay groups. With present limited resources manuals on treatment are furnished physicians, and the entire profession is supplied with applications for "V.D.I." For lay groups, copies of Dr. Parran's article, "Stamp Out Syphilis," are disseminated. In the schools, instruction is limited for the present to collegiate groups. During the early future a concentrated program of speaking engagements is planned.

It is estimated that $10,660 is budgeted for expenditures in the control of venereal diseases and that $12,000 will be expended during the year in the State laboratory for diagnostic methods pertaining to the control of this disease.

TENNESSEE

The Tennessee State Health Department does not have a separate division of venereal disease control. This activity is directed by a full-time venereal disease control officer under the direction of the director of the Division of Preventable Diseases. Funds are available for the employment of a full-time assistant. Efforts are made by the Department to provide medical leadership. State, county and district medical societies are addressed. Each month a review of outstanding venereal disease literature is prepared for the *State Medical Journal*. The women's club and civic groups are becoming interested and the film strips, "Let's Open Our Eyes" and "For All our Sakes," are being used. The Department furnishes free drugs for the treatment of prenatal and congenital syphilis and furnishes material for the treatment of indigent and semi-indigent groups, provided one-half of the cost of the treatment material accompanies the report. The material has been provided through the State at a remarkably low cost.

Neither the direct nor the delayed dark-field

examinations are available free in the State laboratory. However, dark-field equipment has been secured by several of the local health departments. Free serodiagnostic tests for syphilis are performed in the State laboratory.

The Department has budgeted $30,000 for direct expenditure in its effort to make a beginning in the control of this disease. Approximately $12,000 will be expended in the State laboratory this year for diagnostic methods pertaining to the control of the disease. Over 50 per cent of the State's population is served by competent, well trained public health personnel which has a splendid influence in the control and educational methods of the public health aspects of the disease.

TEXAS

The Department has a separate division of venereal disease control and arrangements are being made for special postgraduate training for the director. A concentrated effort is being made in Texas to educate all groups so as to provide an appropriation of $100,000 per annum for a beginning syphilis control program. The Department furnishes free drugs for the treatment of syphilis; however, this activity has not fully developed. The committee from the State Medical Society as well as the State Board of Health has approved of the program and tentative plans are being developed. The State Health Department has purchased a motion picture camera and other educational material to be used by the medical profession and others in arousing sentiment for an active program. Dark-field examinations are made, however, at the State health laboratory for clinics and private physicians and free serodiagnostic tests are performed by the State laboratory.

It is estimated that at least $7,500 will be spent in the control of this disease and that $2,400 will be spent in the State for laboratory diagnostic methods.

VIRGINIA

In December, 1936, the Division of Venereal Disease Control was organized in the Bureau of Communicable Diseases, with a full-time director and associate director. There are thirty-two physicians in the Department's Bureau of Rural Health whose services aid materially in carrying out the venereal disease control program. The program in Virginia involves the ten major considerations as recommended by the Advisory Committee of the Public Health Service. A silent and sound motion picture projector has been acquired which is of value. Other educational material is used with lay and professional groups. The State Health Department also assists in the operation of clinics for the treatment of gonorrhea and syphilis. There are thirty-nine of these clinics, nineteen of which have been organized since 1937. Ten of these clinics make no charge for their services, the remaining clinics charge from 25 to 50 cents, and four charge 25 cents to $1.00. All indigent patients receive free treatment. Laboratory service has been augmented since April, 1937. Delayed dark-field examination for syphilis is part of the service. A State law requires reporting. Free serodiagnostic tests for syphilis are performed by the State laboratory. Considerable educational work in the schools is receiving serious consideration.

An annual budget of $65,000 has been adopted for direct expenditure in the control of venereal diseases and at least $14,800 will be spent in the State laboratory for diagnostic methods in the control of venereal diseases.

WEST VIRGINIA

The Bureau of Venereal Disease Control of the West Virginia Department of Health operates as a separate division of the Department of Communicable Diseases. The personnel consists of a full-time director and a stenographer. The Department furnishes free arsenicals and heavy metals for the treatment of indigent patients to public clinics and private physicians. The Bureau has organized forty-one clinics through the cooperation and subsidies of local governments. Several more clinics are being planned in the same manner. Only indigent patients are admitted for treatment and only then as referred by private physicians and relief welfare agencies. The services of the State laboratory are free of charge to all persons connected with public health programs, to private physicians treating indigent cases or private physicians conducting a public health control program and to State institutions. The Kahn is a routine test. Dark-field clinics are available. Most of the epidemiological investigations are made through the full-time local health departments. Efforts are being made to discover new cases of venereal disease by examination of food handlers and other persons in public service. Routine blood Wassermanns are included in all prenatal examinations. Surveys of industrial organizations, college students, WPA workers and others have been conducted to determine the presence of syphilis. A State law requires the reporting of venereal disease cases. An extensive educational

program has been developed and the usual literature is available.

It is estimated that the Department has budgeted for direct expenditure in the control of venereal diseases $16,700 and that $7,000 will be expended in the State laboratory for diagnostic methods pertaining to the control of venereal diseases during the present year.

SUMMARY

The evidence which has been presented in this report indicates beyond any reasonable doubt whatsoever that outstanding progress has been made in the development of a beginning venereal disease control program and a few of the outstanding accomplishments are listed in comparison with findings by Vonderlehr:[3]

(1) Eleven states of the group have full-time venereal disease control officers in comparison with five in October, 1936.

(2) Ten states distribute free antisyphilitic drugs for the indigent only, and two, Alabama and Maryland, for all individuals, regardless of their economic status.

(3) There is an increase in the use of dark-field examinations, both direct and delayed, since direct dark-field examinations are made free in the state laboratory for clinics in ten of the group and for private physicians in eleven. Delayed dark-field examinations are made free in the state laboratory for twelve of the group and the same number for private physicians, this number having been practically doubled since October, 1936. Free serodiagnostic tests for syphilis are performed in the State laboratory for all of the states except one.

(4) There is a far greater attempt now to develop a more thorough and widespread use of epidemiological investigations of cases of syphilis, due in part to the education of the patient, physician, health officer and the public in general. This movement has also stimulated more reliable morbidity and mortality reports. It is believed that the free distribution of antisyphilitic drugs has played an enormous part in increased reporting.

(5) A much more liberal allotment of funds for direct expenditures in the control of venereal diseases is the one outstanding accomplishment. Every state in the group except one has a budget for direct expenditure in the control of venereal diseases, varying from $7,500 in Texas to $65,000 per annum in Virginia, or an average per state per annum of nearly $30,000. This is exclusive of laboratory, laboratory workers and the training of clinicians.

(6) Free pamphlets, lantern slides, radio talks, motion pictures, press articles, special syphilis control bulletins and numerous educational materials are plentiful. The program has a good start and there is every reason to believe that it will go forward.

(7) The training of personnel, health officers, public health nurses, venereal disease control officers, cooperative clinicians, is a most important factor. Since February 1, 1936, sixteen white physicians have taken a full month's training at Hot Springs, Arkansas. Many other physicians from Southern states have visited the clinic at various periods of time. Since October 1, 1937, Vanderbilt University and other medical schools have offered special instruction for health officers, physicians and others in venereal disease control. The training arrangements should be of enormous value in developing the program during the next several years.

REFERENCES

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2. Public Health Service Reprint No. 56 from Venereal Disease Information, July, 1936, and Public Health Reports, January 22, 1937, of Vonderlehr. pp. 95 to 103.
3. Public Health Reports January 22, 1937, pp. 95 to 103.

DISCUSSION (*Abstract*)

Dr. W. S. Leathers, Nashville, Tenn.—Dr. Sharp expresses in an enthusiastic and direct manner his impelling attitude in the promotion of the program for the control of probably the most menacing disease to human welfare which the federal, state and local health agencies have to deal at the present time. The problem has been neglected entirely too long. Other countries have advanced in the solution of what appears to be a more difficult problem than really exists, provided is it attacked with intelligent leadership and in a scientific manner. The campaign which is being projected on a national scale under the great leadership of Surgeon General Thomas Parran is to be commended by every thoughtful person. Every one should be intent in cooperating in this undertaking. It will mean more for the elevation of health standards in the United States than probably any other phase of public health if the plan is carried out over a sufficiently long time to secure definite results. The undertaking is not an experiment because it is based upon principles as a result of knowledge in both the treatment and control of this disease which gives security in obtaining results. The problem is whether we shall go forward in a plan of endeavor that will be adequate to control the disease. I am optimistic in the belief that this will be done and, therefore, we should prepare to meet the obligation which will be placed upon federal and public health agencies and the medical profession.

The discussion as presented by Dr. Sharp is timely because it represents a general review of what is being

attempted in the southern section of the United States. It is of much interest to know just what steps have been taken and what progress is being made. It will not only be a stimulus to those who are engaged in this service, but it will also serve as a basis for more adequate analysis of what is yet to be done. It is a fact that this problem cannot be solved without sufficient funds and the responsibility of providing financial aid rests with the United States Congress and the respective state legislatures. There should be a cooperative relation between the Federal Government and the states in projecting the program and this will be more effective if done through a cooperative arrangement in the allocation of funds. The discussion indicates the amount of money which has been made available and this is but the beginning.

The factual information which is developed in the discussion is most interesting and helpful. The personnel that has been secured already is promising. It is conducive to better results. The establishment of bureaus in the respective state health departments is suggestive of the line of attack. The provisions that have been made for treatment in practically all of the states mentioned, particularly in Alabama, Maryland and Virginia, are encouraging.

As the essayist points out, the great need is better methods of diagnosis and treatment, the institution of epidemiological investigations, and in general a well-organized plan of attack in dealing with the venereal disease problem. This will require a much more liberal allotment of funds. There is need for more intensive educational procedure and, above all, facilities should be afforded for the training of personnel: health officers, general practitioners and cooperative clinicians, public health nurses, venereal disease control officers, and social service workers. I note with appreciation the reference which Dr. Sharp makes to the teaching clinic which has been established in the Vanderbilt University Hospital, and I may state that this has been organized in the most careful way and instruction is being given from the standpoint of diagnosis, treatment, follow-up, epidemiological investigations, educational procedures and research. The clinic is well organized and excellent facilities are afforded for instruction.

Dr. S. Ross Brown, Washington, D. C.—I wish to take this opportunity to call attention to the program of the Georgia Department of Public Health in bringing to the high school and college students of Georgia this information.

We feel that by bringing this discussion of the venereal disease problem to the boys and girls of high school age, we shall have considerable influence on their minds and probably prevent some of the widespread infection that would otherwise be contracted through ignorance. We of the Georgia Department of Public Health are stressing this phase of the program and feel that it will, in time, have considerable bearing on the progress made in controlling syphilis.

Our discussions to the high school students bring out the facts about the prevalence of the disease; the ways it can be spread—through innocent contacts and otherwise; what is necessary in the way of treatment and the amount of treatment required in the various stages of syphilis in order to obtain the best results; and the effects of the disease. At the conclusion of these talks, the boys and girls are given the opportunity to ask questions. We try to answer as nearly as possible all questions asked, giving the full discussion on these points.

Dr. Sharp (closing).—I want to take this opportunity to express my sincere appreciation to the state health officers in the Southern states who were kind enough to furnish me this information and to Surgeon Mark V. Ziegler of the Public Health Service for his courteous and prompt cooperation in the preparation of this paper.

SYPHILIS IN THE SOUTH*

A STATISTICAL AND CLINICAL STUDY OF SYPHILIS IN A PRIVATE SURGICAL PRACTICE

By FRANK W. PICKELL, M.D.
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In a previous study in 1929 of Negro male surgical patients in an out-patient clinic of the Charity Hospital of Louisiana in New Orleans the author† found a 49.5 per cent incidence of syphilis in 509 consecutive new admissions. This very high incidence interested the author in undertaking a similar study in the community in which he later settled for private practice.

MATERIAL

The community from which the cases in the present study were drawn is a small comparatively isolated Southern town economically dependent on timber and agriculture. About 6,000 persons live in the town and near-by communities, and about 4,000 live on farms or in woods in the local trade territory. About a third of the population is colored. In a recent survey by the local chamber of commerce about 1,300 were found gainfully employed in industry, trades or professions within the town limits.

As no other complete records were available, the author's office diagnostic cases for two recent periods totaling 30 months were studied. All cases of this classification were included and no cases presenting themselves were denied a diagnostic work-up on account of social, racial or financial status. Five hundred thirty-seven consecutive cases are included in this series. These were seen from September 1, 1933, to March 10, 1935, and from October 1, 1936, to September 1, 1937. No hospital, acute traumatic, minor ailment, or minor treatment cases are included. All cases were subjected to a thorough history taking, a complete physical examination, laboratory and x-ray procedures until as complete a diagnosis as possible was arrived at. Prompted

*Received for publication May 14, 1938.

†Cutting, Loria; and Pickell, Frank W.: Syphilis Among Southern Negro Males. Ann. Surg., **91**:269 (Feb.) 1930.

by our previous study in New Orleans, a high index of suspicion of syphilis was maintained, and it was constantly and diligently sought. Repeated and provocative serologic tests were done. This search for lues was our only bias in the clinical approach to these cases.

COMMENT

This study should be informative even though a small series is presented, because:

(1) It was conducted by one person who was interested in syphilis and who had been trained by a previous investigation of the same nature. No correlation of different investigators was necessary.

(2) As far as possible, sampling of cases was avoided and a consecutive series was examined, all from one coherent community.

(3) Reliable serologic tests by the laboratories of the Alabama State Board of Health were made and a precipitation test (Kahn) was checked against a complement-fixation test in practically every case.

(4) All cases were exhaustively studied clinically and syphilis was diligently sought in each case.

(5) White and colored races living under nearly identical conditions in a closely knit community can be compared.

RESULTS OF STUDY

The results of our survey on general incidence of syphilis in our consecutive series of 537 office diagnosis cases shows 27 of 304 whites had a 3-plus or 4-plus serologic test, 8.9 per cent. If to these are added 8 cases with a 2-plus or 1-plus reaction, which had definite clinical findings of lues or history of definite antiluetic treatment, the total incidence of syphilis in the whites becomes 11.7 per cent.

In the 233 colored cases, if the thirteen showing a 2-plus or a 1-plus with clinical evidence of lues are added to the 101 positive ones, the percentage of incidence becomes 48.9 for the colored.

In this series of cases the rate of incidence for colored is over four times that of the whites, the combined average incidence for the two races being 27.6 per cent.

This incidence can be summarized among the races and sexes as follows:

White males, 12.5 per cent in 160 cases
White females, 10.4 per cent in 144 cases
Colored males, 49.4 per cent in 99 cases
Colored females, 48.4 per cent in 134 cases
White, 11.7 per cent in 304 cases
Colored, 48.9 per cent in 233 cases

(2) A check survey from the records of the local health office in a very recent 9 months period shows a percentage incidence of 15.7 in 561 consecutive serologic syphilis tests in both white and colored, when only 3 and 4-plus reactions are counted as positive. The incidence in the 207 cases which were those of the author's office was 20.3 per cent, while in the 354 of these which were the 7 other local doctors, the incidence was 13 per cent.

(3) The incidence of syphilis in the author's series was highest in the following age groups:

White males, 31 to 50 years
White females, 21 to 30 years
Colored males, 21 to 40 years
Colored females, 21 to 40 years

(4) The low incidence in white males between 21 and 30 years was unusual and the high rate in colored over 50 years was noteworthy.

It is noteworthy that among 24 white males over 50 years of age only one luetic was found, and none among nine white females over 50 years.

The colored, contrary to the whites, maintain a high incidence in later life, as eight of the sixteen colored males examined and four of the six colored females above 50 years of age were luetic. Either syphilis is more benign in the Negroes, they contact it in later life more than do the whites, or syphilis in the Negro does not carry a great mortality. This surprising finding is similar to our earlier study in New Orleans, where 14 of 29 Negro males over 50 years of age were luetic.

(5) In the 149 cases of syphilis the following was determined:

(A) Six and four-tenths per cent of cases were primary, 24.8 per cent secondary, 62.4 per cent tertiary, and 6.8 per cent congenital. If only the primary and secondary stages are considered early cases, then 46, or 30.84 per cent, or nearly a third of all these 149 luetics were in this classification. Forty of these 46 early cases were below 30 years of age. Hence in the age group below 30 years is largely found the menace from infectious syphilis.

(B) Sixty-four and nine-tenths per cent of the 37 cases of secondary syphilis had infectious mucous lesions and 80 per cent had generalized adenopathy.

(C) Ninety-three were tertiary cases and of these:

(1) Eight and six-tenths per cent had typical syphilitic leg ulcers.

(2) Four and three-tenths per cent had ulcerative syphilids of palate or nasal septum.

(3) Sixteen and one-tenth per cent had cardiovascular syphilis. There were 2 aneurysms, 3 aortic regurgitation cases, and 10 cases of aortitis, a total of 15 cardiovascular frank involvements. All our cases were 34 years or older. The higher incidence in the colored male is noteworthy, 32.2 per cent. All were laborers handling heavy logs, timber, turpentine or rosin barrels.

(4) Nineteen and three-tenths per cent had skeletal system syphilis.

(D) Twenty-seven and six tenths per cent of 130 secondary and tertiary cases showed central nervous system involvement clinically.

(E) Fifty-four per cent showed generalized glandular involvement, but only 30 per cent showed typical epitrochlear adenopathy.

(F) Twenty per cent had positive history or positive evidence of gonorrhea.

(6) The 51 pregnant cases in this series closely parallel the general incidence in 1.

(A) Ten per cent of 30 whites were syphilitic

(B) Forty-two and eight-tenths per cent of 21 colored were syphilitic.

(7) Of the 75 syphilitic couples married over one year,

(A) Sixty per cent were sterile or gave history of 1 or more miscarriages.

(B) Forty-four per cent gave history of 1 or more miscarriages.

(C) Thirty-two per cent had never had a living child.

CONCLUSION

The economic loss from syphilis in this community as in the United States generally must be very great.

ANEMIA AND PREGNANCY*

A THREE-YEAR STUDY ON NEGRO WOMEN

By AMEY CHAPPELL, M.D.
and
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Of the numerous studies[1-7] which have been made of the anemias of pregnancy, with two exceptions, none have dealt with Negro women. First and others[4] included in their work on a thousand patients about five hundred Negroes, but the findings were not reported separately as to race. Kracke and Garver[8] stated that 97 of 100 pregnant Negroes had less than 70 per cent hemoglobin (Sahli), but gave no other blood findings, so we found ourselves asking these questions:

(1) Have colored women in the southeastern United States a red blood cell count and hemoglobin similar to those of white women?

(2) If anemia develops in these women during pregnancy how severe is it? Does it follow the usual trend of hypochromic anemia which occurs often in pregnant white women? Is the food eaten responsible for the anemia? What can be done to prevent it?

With these questions in mind, we have studied 404 Negro women, of whom 329 were pregnant. They have been seen in the Colored Division of Grady Hospital, Atlanta. This is a municipal institution admitting only charity patients. All may be assumed to belong to the same social stratum. Their ages ranged from 14 to 45 years, with an average of 22 in the pregnant group and of 25.3 in the non-pregnant. All had a negative Wassermann test at the beginning of the study. These women, often uncooperative, were poor, some were on relief rolls, and many were of low mentality. Studies on a higher class of patients would perhaps yield different results, but for these particular groups we think our results are accurate.

TECHNIC

At the start, red blood cell counts and hemoglobin readings were made at the same time from venous and capillary blood of 31 of the women. The average difference in the hemoglobin readings was 0.059 grams (0.35 of 1 per cent) and for the red blood cell counts 11,613. These differences were so slight that capillary blood was used because of the simpler technic. Hematocrit determinations were also made on this group, but for this particular study they seemed to be of no greater value than the older method.

All the blood studied was obtained and diluted by one person (A. C.). A deep puncture was made through the skin of the forefinger either with a small lancet or a needle so that very little pressure was necessary to secure bleeding. For the red blood cell counts the blood was diluted 1:100 with normal saline. Pipettes complying with the requirements of the United States Bureau of Standards were used. These were closed by rubber bands and the cells, except in a very few instances, were counted within four hours of the time the blood was obtained. The pipettes were shaken briskly by hand for two minutes

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*Read in Section on Obstetrics, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Obstetrics and Gynecology, Emory University School of Medicine.

*This paper received, for the year 1936, one of the two L. C. Fischer annual awards for the best papers submitted by members of the Fulton County (Georgia) Medical Society.

before counting. A Bausch and Lomb counting chamber with the Bass and Johns ruling was used, all five squares being counted. The hemoglobin readings were obtained by means of a Newcomer hemoglobinometer. On this instrument 100 per cent is equivalent to 16.92 grams of hemoglobin in each 100 c. c. of blood. For illumination a Westinghouse daylight bulb was used and was so arranged that its distance from the colorimeter was constant. No reading was made in less than forty minutes after dilution and all were checked by reversing the cups of the colorimeter. All hemoglobin readings were made by one of us (L. B.). All of the red blood cell counts were done by the other.

THE NON-PREGNANT CONTROL GROUP

Some difficulty was experienced in selecting the seventy-five women of the non-pregnant group. Because of the desire for economic similarity, it was decided to use Grady Hospital patients for comparison. Those from the gynecologic clinic were chosen, though it was realized that they were not healthy and were far from ideal material for a control group. A few were found to have no gynecologic disease, but the majority were under treatment. Many of them had chronic pelvic inflammatory disease, mild cases which had been under treatment and were nearly ready for dismissal. Some had uterine displacements and others infections with the *Trichomonas vaginalis*, but none was acutely ill.

Table 1

DIAGNOSES ON NON-PREGNANT PATIENTS

Cystitis	1
Chronic tonsillitis	1
Hypertension	1
Gastroenteritis	1
Chronic appendicitis	2
Cystic ovaries	2
Subacute salpingitis	3
Uterine fibroids	3
Retroversion	7
Trichomonas vaginalis	8
Amenorrhea—non-physiologic	10
Endocervicitis	10
Pelvic inflammatory disease	26

Table 1 shows the diagnoses which had been made on these patients. All were physically subnormal, but were comparable to the other groups since they differed only because they were not pregnant.

In this group of non-pregnant women the average hemoglobin reading was 9.1 grams (53.8 per cent) and the average red blood count was 4,419,000. The range of the hemoglobin was 5.92 to 12.86 grams (35 to 76 per cent), and of the red blood cells 3,550,000 to 5,710,000. Kracke and Garver,[8] from determinations on 312 white women college students, state that the average red cell count in this community is 4,085,000 and the average hemoglobin (Sahli) is 79.1 per cent.

Table 2

NON-PREGNANT PATIENTS

Number, 75
Average age, 25.3 years
Average hemoglobin, 9.1 gms.
Average R. B. C., 4,419,000

THE PREGNANT GROUPS

There were 769 red blood cell counts and 749 hemoglobin determinations made on 329 pregnant women. Of these, 188 were divided into four groups and were followed by repeated blood studies for three months or more. Criteria for admission to those groups for special study were: pregnancy, not later than the fifth month; a negative Wassermann reaction; and a willingness on the part of the patient to cooperate. In no instance were patients selected for these studies on the basis of a blood count. The women chosen were given consecutive numbers. Group I includes 75 women, all of whom had even numbers; these were followed through pregnancy without any treatment that might influence the blood findings. Because patients were admitted to this group for more than a year it was felt that any possible seasonal variation in hemoglobin or blood counts was avoided. In Group II were 48 women who were given cod liver oil throughout the time of study. The 36 women in Group III received a 50 per cent solution of iron ammonium citrate. The 29 women in Group IV were given intramuscular injections of liver extract. Groups II and III had odd numbers and those in Group IV consecutive numbers.

GROUP I

There were 75 women followed in Group I without any treatment. Their ages ranged from 14 to 35 with an average of 21.4 years. There were 40 primiparas, 35 multiparas. The average of 181 hemoglobin readings made on these women was 8.91 grams (52.67 per cent), while the average of an equal number of red blood cell counts was 3,768,000. Thus with no factor except pregnancy to account for the variation, we found 75 women with an average red blood cell count 651,000 less than an equal number of non-pregnant women, and with a hemoglobin reading

that was 0.191 grams (1.13 per cent) lower. The average red blood cell count early in pregnancy was 3,851,000 and the average at least three months later was 3,728,000. The average early hemoglobin reading was 9.22 grams (54.5 per cent), while three months or more later it was 8.67 grams (51.25 per cent). In the latter part of gestation 58.67 per cent of the women had a lower hemoglobin reading and 62.7 per cent a lower red blood cell count than in early pregnancy.

Table 3
PREGNANT PATIENTS
Followed without Treatment

Number, 75	Average age, 21.4 years	
Primiparas, 40	Multiparas, 35	
Blood Studies	Averages Hb.	R. B. C.
Total No. 181	8.91 gms.	3,768,000
First reading	9.22 gms.	3,851,000
Final reading	8.67 gms.	3,728,000

Considerable work has been done by other investigators[3-7] on the changes in the blood during pregnancy of white women. These studies demonstrate a steadily declining hemoglobin and red blood cell count in the majority of women until about the thirtieth to the thirty-fourth week of pregnancy, when commonly there is a slight decrease in the anemia. The fact that as gestation progresses Negro women have a similar increasing anemia seems established. The medication given in our other groups was given not so much with the idea of improving the anemia, which was usually found at the first examination, as it was with the hope of preventing an increase of the anemia as pregnancy progressed.

GROUP II

There were in Group II 48 women whose ages ranged from 15 to 32 with an average age of 20.5 years. Twenty-three were primiparas and twenty-five multiparas. All were given cod liver oil.

Twenty-three received the regular plain oil, which was bought in bulk and dispensed by the hospital drug room. The amount given was two tablespoonfuls daily. The average amount taken per person during the months of observation was 51.13 ounces. These women had an average hemoglobin reading when first seen of 9.18 grams (54.3 per cent) and three months or more later of 9.1 grams (53.8 per cent). The first red blood cell count averaged 3,815,000, the last 3,743,000. There was a decrease in both hemoglobin and red blood cell counts in 43.4 per cent of the women in this group.

Table 4
PREGNANT PATIENTS
Given Cod Liver Oil

Plain Cod Liver Oil	Averages Hb.	R. B. C.
First reading	9.18 gms.	3,815,000
Final reading	9.10 gms.	3,743,000
Concentrated Cod Liver Oil with Viosterol		
First reading	8.34 gms.	3,810,000
Final reading	9.03 gms.	3,912,000

Twenty-two women were given a concentrated cod liver oil with viosterol,* averaging 23.59 ounces apiece. This preparation was more palatable and was probably taken more regularly. Three teaspoonfuls were given daily. For these the average first hemoglobin reading was 8.34 grams (49.31 per cent), the second 9.03 grams (53.36 per cent). The first red blood cell count was 3,810,000, the last 3,912,000. Lower red blood counts were found at the last examination in 36.3 per cent; lower hemoglobin readings in 54.5 per cent.

Three patients in this group were inadvertently given both kinds of oil.

It is to be noted that the patients having cod liver oil with viosterol showed a decided improvement in the red blood cell counts. Those having the plain oil had a better blood picture than the untreated group. The readings in many cases did not show an increasing anemia as pregnancy progressed and often there was actual improvement. These facts suggest that the lack of vitamins A or D, or both, may have a share in the etiology of these anemias, as was shown by Wills[9 10] in tropical anemias.

GROUP III

Group III was given a 50 per cent solution of iron ammonium citrate, made by dissolving two ounces of the salt by volume in four ounces of water. The women were asked to take a teaspoonful of this mixture three times daily. Because Strauss,[11 13] Mussey,[12] and others[14 16] have reported good results from iron we anticipated a similar effect. We were both surprised and disappointed. Many of the patients complained of abdominal pain and diarrhea and some of nausea and vomiting after taking the medicine. Occasionally they refused to take it

*Supplied through the courtesy of Mead Johnson & Co.

altogether. We had considerable difficulty keeping the solution free from molds.

Finally included in this group were 36 patients with an average age of 22.3 years and a range from 16 to 36 years. Thirteen were primiparas, 23 multiparas. One patient had 40 ounces of "Tamate," a preparation containing several iron salts; one had 24 ounces of "Tamate" and 15 ounces of the solution of iron ammonium citrate; the others had an average of 25.1 ounces of iron ammonium citrate.

Table 5

PREGNANT PATIENTS

Given Iron Ammonuim Citrate

Number, 36	Average age, 22.3 years
Primiparas, 13	Multiparas, 23

Average amount given per patient, 25.1 oz. 50 per cent solution

Blood Studies	Averages Hb.	R. B. C.
First reading	8.54 gms.	3,861,000
Final reading	8.48 gms.	3,824,000

The average first red blood cell count in this group was 3,861,000; the last 3,824,000. The early average hemoglobin reading was 8.54 grams (50.47 per cent); the later one 8.48 grams (50.1 per cent). Fifty per cent of this group had decreased hemoglobin and red blood cell counts during the three months or more of observation.

This was our most uncooperative group and the results, while showing an improvement over the untreated group, are not so good as other experimental work had led us to expect. They would possibly have been better had the iron been taken with more regularity.

GROUP IV

Twenty-nine women were given 1 c. c. of concentrated liver extract* intramuscularly each week for an average of 19.2 weeks. This group was selected because of their intelligence, since the supply of the preparation was limited and we desired full cooperation. Their faithfulness in clinic attendance added weight to their almost unanimous opinion that the liver made them feel well. It is certainly true that members of this group had fewer complaints than most of our pregnant women.

Their ages ranged from 14 to 35 with an average of 20.8 years. Seventeen were primiparas, twelve multiparas. The average hemoglobin estimation on the first examination was 7.92 grams (46.8 per cent). The average red blood cell count was 3,826,000. Three months or more later the hemoglobin was 7.85 grams (46.41 per cent) and the red blood cell count 3,657,000. There were 48.2 per cent of these women who had decreased hemoglobin readings and 65.6 per cent who had decreased red blood cell counts in the three months interval. These findings were similar to those in the untreated group.

Table 6

PREGNANT PATIENTS

Given Concentrated Liver Extract Intramuscularly

Number, 29	Average age, 20.8 years
Primiparas, 17	Multiparas, 12

Average amount given per patient, 19.2 c. c.

Blood Studies	Averages Hb.	R. B. C.
First reading	7.92 gms.	3,826,000
Final reading	7.85 gms.	3,657,000

We have no explanation to offer for the fact that the hemoglobin readings for this group were much lower than those of the other groups. Altogether 90 readings were made with an average of 7.94 grams (46.9 per cent), which is more than 2 per cent lower than any other group, while the red blood cell counts averaged 3,702,000; this figure, too, being somewhat less than other averages. While the hypochromic anemias are not usually expected to respond to liver, some improvement has been reported[13 16] in small groups of patients after giving it. Except for the subjective feeling of well-being our results were unsatisfactory.

DIETS

In an effort to arrive at some conclusion as to the cause of these anemias, a study was made of the diets of one hundred of the more intelligent women. This selection probably did not include those who had the poorest diets, but it was felt desirable from the standpoint of accuracy. Answers to questions as to the kind and amount of food eaten were carefully recorded. The data was surprising in spite of the fact that we knew the diets were inadequate.

Fruit of some sort was eaten 3.9 times per week; this was usually an apple. Nineteen of the patients had no other kind of fruit. Six did not eat fruit of any variety and sixty-six ate no citrous fruits.

Though thirteen of the women ate no cereal the majority had grits (finely ground corn)

*Supplied through the kindness of Eli Lilly & Co.

Table 7

COMPOSITE DIET OF 100 PATIENTS

Food	Times Eaten per Week
Fruit, usually apples	3.9
Cereals	5.7
Meat and fish	5.1
Eggs	2.1
Vegetables:	
Potatoes	4.4
Other vegetables, cooked	6.2
Other vegetables, raw	2.6
Milk	3.7 pints per week
Bread	2.5 times per day

daily. A large number ate rice, but other cereals were rarely taken.

Eggs were practically never used for cooking. Fifty-one of the patients ate no eggs and twenty-three had one egg not oftener than twice a week.

Green vegetables; cabbage, turnip greens, or collards, were eaten almost daily, and were the only vegetables, except potatoes, which twenty-three of the women ate.

In spite of the fact that these patients had been instructed to drink at least two glasses of milk daily, we found that the average was 3.7 pints a week. Twenty-one drank only buttermilk; twenty-one others did not drink milk of any kind. The majority took neither tea nor coffee.

Usually only two meals a day were eaten. Breakfast included grits, biscuits, butter or more often a butter substitute, syrup and possibly fruit. Dinner, which was eaten in the mid-afternoon, consisted almost always of beef or pork, greens and corn bread.

DISCUSSION

It is obvious that the diet in this group of women is inferior. There is a glaring deficiency of vitamins A, C, and D, yet most of these patients are of normal weight for their height. Their skin had a healthy glow. The majority show none of the ear marks of malnutrition in spite of their hypochromic anemia. The pregnant and the non-pregnant eat the same food, with a greater quantity and perhaps some increase in the amount of fruit for the former, yet when pregnancy occurs anemia develops. Is it that the balance between essential food and excess is so slight that the burden of pregnancy cannot be met? Or is it that during pregnancy the gastric acidity is decreased, as has been claimed,[15] so that there is a poorer utilization of the available food? Kracke[8] has stated, however, that in one hundred Negroes he was unable to find a relationship between gastric acidity and anemia during pregnancy. We believe that hypoacidity has little bearing on the anemia in these patients. Hydremia must play a part as has been shown,[17] but could hardly be responsible for the entire change in the blood findings.

There is in our study a deficiency of vitamins A and D and improvement in the blood picture occurred when these were supplied. Therefore it is felt that their absence contributed toward the anemia. They could not have been entirely responsible, since these vitamins were also absent from the diets of the non-pregnant group, in whom red blood cell counts were much higher. Some factor, so far undetermined, but depending on pregnancy itself, must be responsible for secondary anemia occurring during gestation.

SUMMARY

(1) Red blood cell counts and hemoglobin determinations were made on 404 Negro women.

(2) The non-pregnant group of seventy-five had a slight secondary anemia.

(3) One hundred and eighty-eight pregnant women divided into four groups were followed for three months or more by repeated blood studies.

(4) The majority of the untreated pregnant patients had an increasing anemia as gestation progressed.

(5) Cod liver oil caused improvement and in the majority prevented the increase in anemia.

(6) Iron by mouth and liver extract intramuscularly, given separately, had little effect on the anemia. The liver gave a sense of well-being.

(7) A composite diet of 100 patients showed deficiency in vitamins A, C and D, but sufficient amounts of iron.

(8) No essential difference existed in the diets of the pregnant and the non-pregnant, so an avitaminosis cannot be wholly responsible.

(9) Hydremia, diet and gastric deficiency, though contributory, are not thought to be the principal factors in producing anemia associated with pregnancy.

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DISCUSSION (*Abstract*)

Dr. E. Durham Colvin, Atlanta, Ga.—This paper reveals that the changes in the blood of women of a very low stratum of society are identical to those occurring in pregnant women who, from a sociologic standpoint, are less unfortunately placed. It is not necessary to say that the authors have spent an enormous amount of time and energy on this piece of work.

A review of the literature reveals that there is still a considerable difference of opinion among investigators concerning the simple, mild anemia encountered among pregnant women. The most frequent picture is a change simulating a hypochromic, microcytic anemia, which is commonly considered to be a deficiency disease.

In my opinion, the great majority of atypical blood pictures found in pregnant women are due to physiologic rather than pathologic changes. As a rule, very few of these women give symptoms of anemia. Also, providing there has not been an increased blood loss at the time of delivery, the blood picture will have returned to normal within a short time following confinement.

Before one can venture a diagnosis of anemia during gestation he must keep in mind that there are certain physiologic factors capable of producing a picture of anemia during pregnancy. They are as follows:

(1) Inadequate diet. Because of fetal demands, a diet which has been adequate in the non-pregnant state may become insufficient as gestation advances. The age-old belief that meats should be limited or restricted in the diet of pregnant women is erroneous. A diet rich in meats, eggs and vegetables offers the best protection against anemia. Coons has shown that green vegetables cannot replace meats and eggs in preventing anemia. It is my belief that pregnant women should be permitted to consume a normal or slightly increased amount of meat in their diets. I do not think that protein should be restricted even in the presence of toxemia complicating pregnancy. In early pregnancy, dietary deficiencies are further increased because of the nausea and vomiting prevalent at that time. The patient cannot ingest the proper amounts of nourishment.

(2) Strauss and Castle, in 1934, pointed out that during pregnancy there is a decided tendency toward gastric hypoacidity. This interferes with the proper utilization of ingested iron.

(3) Materials essential in the formation of fetal blood and its hemoglobin are transported through the walls of the chorionic villi from the maternal blood stream. This causes a drain on the iron resources of the mother. The fetus obtains its full requirements of iron even though the mother may be seriously anemic. During intrauterine life, fetal blood must contain a greater hemoglobin concentration than is necessary after birth, if oxygen deficiency is to be avoided. The blood in the fetal arterial tree is partly venous and consequently has a low oxygen saturation, even though fetal metabolism requires more oxygen per unit of weight. Before the onset of respirations, the fetal blood contains approximately three grams of hemoglobin per 100 c. c. This rapidly diminishes after breathing occurs.

(4) During the last trimester of pregnancy the fetus rapidly stores iron in certain of its tissues. The liver of the new born contains approximately three times more iron per unit of weight than does the liver of the adult. This storage of iron probably supplies fetal demands during the early months of life when milk, a food poor in iron, is its only nourishment.

(5) In addition to the fetal demands, it is also necessary for the mother to supply iron for the tissues of her own body undergoing hypertrophy and hyperplasia. The breasts and uterus enlarge rapidly. The muscle of the uterus has a very high iron content. Before pregnancy it weighs about two ounces. After delivery, stripped of the products of gestation, it weighs approximately two pounds, or is increased in weight sixteen times.

I feel that, in the majority of cases, the so-called anemia of pregnancy results from physiologic rather than pathologic processes accompanying gestation. The only definite statements which can be made concerning it are: that approximately 50 per cent of all women, private and clinic patients, develop a harmless, physiologic type of anemia. It responds sluggishly, but best to massive doses of iron, and, in most cases, disappears soon after delivery.

Dr. Richard Paddock, St. Louis, Mo.—The authors of this paper ask whether colored women in the southeastern United States have a red blood cell count and a hemoglobin similar to those of white women? It appears from a comparison of their figures with those of Plass, Kuhnel, Feldman, and others, that the red count and hemoglobin in the colored women studied runs much lower than in white women elsewhere in the United States and in Germany.

Although the hemoglobin reading and the red cell count in the non-pregnant group were low, it seems surprising that there was not more difference noted between the untreated pregnant group and the non-pregnant group. From the results obtained by our essayists, it seems that in spite of the difference of degree of anemia between white and colored patients, the course of the anemia is generally parallel.

It is of especial interest to all to see the data obtained on the second group, who received cod liver oil. I venture to say that most of us would expect this group to show a marked decrease in the degree of anemia where

the oil was used. The results obtained show no great difference; certainly not as much as one might expect after having heard much of the benefits of cod liver oil in recent years. Feldman and others were unable to show much change in the degree of anemia in the pregnant rat fed on supplements of cod liver oil and other substances, including liver. It is encouraging to see some improvement in the cases receiving concentrated cod liver oil with viosterol.

It is natural to anticipate a marked improvement or diminution of anemia in the pregnant patient given iron. In spite of the fact that the pregnant woman conserves iron and the excretion of this mineral is reduced, and that all pregnant women probably show a positive iron balance, careful observers report no appreciable effect of iron on the anemia. Mitchell and Miller, as well as Feldman and others, show essentially the same results with rats. Results with liver extract are equally interesting.

No work of this kind would be complete without attention to diet. The subject of diets, particularly in the Negro, is included in the paper. It appears from this series of observations that the pregnant woman in spite of diet is a highly efficient metabolic organism. She will glean from her intake essentials for the nutrition and storage requirements of the fetus, almost every iota of necessary element, and at the same time will compensate for abundances or deficiencies to the limit of her capacity.

This paper tends to confirm my observations on the blood picture in pregnancy. First, there is a physiologic anemia of pregnancy which follows a parallel course in women varying in degree or numerical values with the locality or race. This is compensatory regardless of the status of the individual within certain limits. Beyond these limits other factors play a part, namely, intercurrent diseases affecting the blood picture, degrees of nutrition, and lastly, perhaps supplementary substances in the organism.

These workers have contributed something to the knowledge of all of us in regard to the physiology of pregnancy. Let us remember what we have learned from them.

UTERINE RINGS*

By JAMES R. GARBER, M.D.
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The history of obstetrics is replete with romance, as well as of factual record. One has but to review the story of childbirth among the tribes of early ages, and even as late as the first part of the Nineteenth Century, to realize the astounding progress of this science. Fortunately for womankind, as the influence of advanced civilization earmarked her for more dangerous motherhood, the students and laborers in obstetrical work have drawn upon the resources of knowledge, understanding and practical means to protect women against the very forces calculated to promote life, health and happiness. Indeed, as Howard W. Haggard has aptly written,

"The position of woman in any civilization is an index of the advancement of that civilization. * * * * Accordingly, the advances and regressions of civilization are nowhere seen more clearly than in the story of childbirth."

With such an appraisal of obstetrics as an heritage of present day obstetrical attendants, the consciousness of profound and far-reaching responsibilities becomes more conclusive and weighs heavily upon our shoulders. Then, such influences impel one to seek all available information that will insure a service that will reflect merit and success.

It is the intention of this presentation to discuss the clinical aspect of uterine rings rather than the anatomic consideration of the phenomenon. The approach to this discussion is made with a sense of genuine humility, but not without a very definite fact established in the mind of the writer. Expression of this fact may border upon a semblance of heresy; however, inasmuch as clinical facts will be the burden of this message, there may be extenuating circumstances for holding to the belief that there is no such thing as authority, except when facts are based upon the axioms of science. Much of the practice of medicine is individualistic, dependent upon the complexities of the individual patient and upon the capacities of the individual physician. The patient with genuine pathology does not err, but the clinician commits the breach in judgment or in technic. Uterine rings undoubtedly are based upon bona fide anatomic disorders, but they still remain clinical entities, and are probably not subject to authority as much as to the judgment and skill of the operator.

Perhaps the most valuable and most important message to bring, in this connection, is the truth embodied in the statement that there is incalculable uncertainty of uterine behavior in labor. The action of the uterus is unpredictable; consequences resulting therefrom are annoying and the management of such conditions demands refined judgment and utmost technical skill.

The uterine musculature may develop the retraction ring of Bandl, constriction rings and tetanic contraction of the entire structure. Inasmuch as uterine behavior is an unknown quantity in each individual case, and is a variant in the same individual, it is the better part of wisdom to anticipate such misbehavior in every labor case.

*Read in Section on Obstetrics, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

The relative occurrence of uterine rings places the constriction ring in the forefront in the experience of the writer. Should this statement be challenged, the conclusions will be found dependent upon clinical diagnosis and interpretation of what actually constitutes the different varieties of rings.

It is an established fact that the retraction ring of Bandl occurs at the juncture of the upper and lower uterine segments. In its development the passive lower segment may be stretched to one millimeter in thinness and the active upper segment may be shortened to 4 centimeters in thickness. Resulting from this formation is an inability of the upper segment to retract the lower segment over the presenting part; the continuity of action has been interrupted and the forces of labor are resolved into a vicious circle. Indeed, when this soft structure dystocia arises the uterus may be considered to be in a state of secondary inertia. This is logical, for, if Bandl's ring is a normal finding and the retraction ring is an eerie behavior of the structure, due to adverse stimuli, the argument should hold that the ring *per se* is not the cause of dystocia. It is the precarious condition of the thinned, elongated segment that is the cause of anxiety for mother and child during labor and at the time of delivery. The following situation may be easily visualized: the presence of a paper-thin tissue lying between opposing bony structures, the presenting part of the child and the pelvis of the mother. In the presence of such a condition rupture of the uterus, either spontaneously or incident to operative delivery, may occur and this renders an untoward act on the part of the patient or of the doctor a grave commission.

A fundamental weakness in many obstetrical attendants, in regard to the retraction ring, is the apparent belief that the tissues of the band described by Bandl are structures that actually develop during labor. The knowledge that this band develops early in pregnancy and is fanned into irritability by stimuli arising during labor seems not to register in some minds.

Following the remarks as set forth above, it seems expedient for the clinician to investigate the stimuli that predispose to the retraction ring. Some of these may be enumerated: malposition, early rupture of the membranes, prolonged labor, maternal exhaustion, unsuccessful attempts at delivery, injudicious administration of oxytoxics, the vicious use of pains, mal-presentation and others. These constitute a roll call of causative factors that should, by their very sinister nature, overwhelm the obstetrical attendant with fear and caution. These entities are, in most part, discernible to the astute practitioner and in part may be avoided. The writer regrets that Bandl's ring is not visible so that the cautious one may be warned and the reckless attendant may be given an eyefull of impending grief.

Recognition of retraction rings is not always simple nor can a rule of thumb be enunciated for its diagnosis. However, it may be suspected if not diagnosed, by lack of progress of labor; pains changing in frequency and duration, or the uterus remaining constantly contracted; the presence of a furrow in the uterus may be palpated through the abdominal wall, which furrow rises as the ring becomes more pronounced. Examination under anesthesia should definitely establish the diagnosis.

The management of retraction rings is prophylactic and active. Prophylactic treatment encompasses removal of every predisposing cause, insofar as possible; the generous and wise use of analgesics; the absolute restraint in the use of oxytoxics; correction of malposition and malpresentation by prophylactic version and supportive care of the mother. It should be stated here that it will be ill advised to advocate emptying of the uterus when this structure is in a state of inertia. Active treatment for the stubborn ring requires deep surgical anesthesia, preferably with ether; morphine sulphate, epinephrine chloride, intravenous glucose, avoidance of trauma in operations. Should this therapy fail to relax the ring so as to permit the delivery of the child through the normal passage, abdominal section, preferably the low laparo-trachelorraphy, is the course of last resort.

The following case report brings out interesting features of retraction ring and its management.

The patient was a white primipara, aged 34. Two weeks before the onset of labor, the uterus was of such board-like rigidity that palpation of any part of the fetus was impossible. At the onset of labor the uterine condition had not changed. Throughout a long labor, analgesics were used freely. After 38 hours of bona fide labor, with dilatation of 3 to 4 centimeters, with head engaged plus 3 and a deep furrow midway between the symphysis pubis and the umbilicus, the patient was given a deep ether anesthesia, and was administered 5 minims of epinephrine before an attempt at version was made. The ring had not yielded, so further anesthesia was continued, and another 5 minims of epinephrine was given. The ring remained unyielding. A 22 millimeter bag was introduced; ¼ grain morphine sulphate and 500 c. c. of 5 per cent glucose solution were administered. Within three hours the bag was expelled, leaving a completely dilated cervix. The vertex again

engaged in left occipito-anterior position and, for the first time, the uterus relaxed between pains and the fetal small parts could be palpated. Low forceps operation was performed and the child delivered in occipito position. No difficulty with delivery of the shoulder nor in expulsion of the placenta was encountered. Bleeding was less than normal. A live baby, weighing 7 pounds 9 ounces, was delivered in good condition. The mother left the delivery room in excellent condition. It is obvious that the uterine behavior was "haywire" at the onset of labor, which precluded any prophylactic steps, although malposition had been previously diagnosed. .It is the belief of the writer that the greatest service rendered in this case was in refraining from making bad matters worse by undue manipulation.

Constriction rings are more frequent than the type just discussed. They result from an imbalance of action of the longitudinal and circular fibers of the lower pole of the uterus, an imbalance in the polarity of the uterus, wherein the circular fibers exert the greatest action. Unless these latter fibers relax and a normal equation in this pole of the uterus can be established, the constriction ring is an omnipresent factor.

Unlike the retraction ring, there may be one or more constriction rings coexistent in a given case. Further, these rings cause dystocia *per se*, as they appear in the presence of normal cephalopelvic relations. They do not change position and are not the occasion of a thinning of the lower segment nor a thickening of the upper segment; in fact, the uterus above the ring is usually in a normal condition. Consequently, rupture of the uterus in the presence of constriction rings is remote.

The etiology of this complication of labor is unknown. However, L. Rudolph, after an exhaustive study, mentions the following as a basis for this disturbance of the physiology of the uterus:

Parity.—Most frequent in primiparae.

Rupture of Membranes.—Most frequent in early rupture.

Malpositions and Malpresentations.—Most frequent in vertex; next most frequent in breech.

Drugs.—Most frequent when ergot has been administered.

Prolonged Labors.—Most frequent in the first stage.

The recognition of constriction rings is best made by examination under anesthesia. The operator will find the ring just behind the symphysis pubis. The cervix will be soft and, in all probability, dilatable. The impression of a conical canal will be gleaned. The constriction will be found about the neck of the child and will not permit the passage of the hand through it. The attendant will note a standstill in the progress of labor even though pains are considered most typical. These findings are classical and, with care, the operator can circumvent unhappy end results when confronted with this particular complication.

In the management of this type of ring, prophylaxis offers a safe anchor. The maximum value of this phase of treatment lies in sufficient patience on the part of the operator and, at the same time, due regard being given to the prevention of maternal exhaustion. The writer has encountered constriction rings on numerous occasions, and, in all but one instance, has been able to effect delivery *per vaginam*. Despite this statement, nothing has ever been done which in his belief caused relaxation of the ring. To the contrary, it is the belief of the writer that the successful termination of labor occurs because of the grade or degree of constriction. Ether may have contributed to the relaxation, and yet, it is just possible that at the time of operation the ring was in the process of spontaneous relaxation. The writer is strong in the belief that, unless a constriction ring is disposed to dissolve itself, therapy will be disappointing.

The material that has been submitted for your consideration has been limited in discussion because there is very little literature available for a more exhaustive study. Perhaps, as in this instance, the opinion reflected in papers by others, or in a discussion, must be based upon the individual's observation. Out of this entire matter comes to the surface a thought that the writer feels impelled to submit at this time. That thought is the possible disservice that authors and those associated in clinics render in teaching and advocating that labor cases should be left alone, and, despite malposition, that a case will eventually terminate spontaneously.

The writer recognizes that malposition is a complication and, in itself, can be the occasion of untoward difficulties and, through the complications arising from any neglect of properly handling such equations, the complications resulting therefrom can become more formidable than the original complication of malposition.

It is a mistake to disregard a prolonged labor, feeling that a normal delivery or a low or midforceps may eventually be employed. The judgment of the operator is the supreme talisman of the conduct of any given case. There can be no doubt that many of us pursue certain procedures that are unexplainable and yet, prove to be the

correct course of action. The writer believes in conservatism, but will never yield to the dictum that patience is the only virtue in this connection, as it has been frequently observed that "a stitch in time saves nine." Prophylactic work is certainly conservatism. The lesson that authors and teachers should promulgate should be to the effect that when a labor case develops definite indices of abnormality, the attendant should be sufficiently versed in obstetrical knowledge to recognize them and, if he is not in a position to handle the situation alone, competent assistance should be secured.

The consideration of uterine rings encompasses the opinion herein expressed and, if nothing else is gleaned from this presentation, it is to be hoped that every obstetrical attendant will be awakened to the significance of such conditions, and so discharge his duties as to be a worthy exponent of the adage, "To be forewarned is to be forearmed."

CASE REPORT

This report of a case will indicate the far-reaching consequences of a constriction ring. The patient was a white primipara, aged 27. Four days before the onset of labor the membranes ruptured. The uterine condition of the patient, upon examination, was found to be normal. On the evening of the fourth day, after rupture of the membranes, labor began. For a period of from 12 to 14 hours, the pains were not considered to be of a severe nature, and were somewhat irregular in their recurrence. The following 12 hours the patient experienced what was considered to be a typically nulliparous labor. Sedation was obtained through narcotics and fluids were given freely. The next 6 hours brought about an indifferent type of labor and, up to this time, the cervix had dilated only 3 centimeters and the head was well engaged in left occipito-posterior. There was no indication of a retraction ring and, sensing the occurrence of a constriction ring, the patient was examined under ether anesthesia. An iron-like ring was found about the neck of the fetus. A 22 millimeter bag was introduced and the patient given further narcosis. Within two hours the bag was expelled, leaving a completely dilated cervix. The patient was then deeply anesthetized with ether and, on examination, the ring was present as originally described. Epinephrine was administered with no results. Forceps delivery was not attempted and a version was impossible. A low laparotrachelorraphy was decided upon. At the operation the child was in a persistent left occipito-posterior. The operator had opened the uterus below the ring and was unable to deliver the shoulders until this structure had been severed. The baby, weighing 7 pounds 8 ounces, was delivered alive. Its neck was definitely swollen and its eyelids were double the normal size as a result of the venous congestion resulting from the pressure of the ring. The mother was returned to her room in excellent condition and had a remarkably uneventful postoperative course.

DISCUSSION (*Abstract*)

Dr. Jas. R. Bloss, Huntington, W. Va.—The essayist proposes to discuss the clinical aspect of uterine rings rather than the anatomic consideration of the phenomenon. He says that the patient with genuine disease does not err, but the clinician commits the breach in judgment or in technic and that uterine rings undoubtedly are based upon bona fide anatomic disorders, but they still remain clinical entities, and are, probably, not subject to authority as much as to the judgment and skill of the operator.

We can agree with him that uterine rings are clinical entities, but question seriously the thought concerning the judgment and skill of the operator. It would seem that this last, and the application of it, is dependent upon a very thorough understanding of the anatomic disorders. To handle these patients satisfactorily from a clinical standpoint necessitates a definite differentiation between a tetanic contraction of the entire uterine musculature, constriction rings which may be abnormal and a true "retraction ring of Bandl."

Time does not permit going into the detailed etiologic factors underlying the development of these complications. One cannot but wonder, however, if the incalculable uncertainty of uterine behavior in labor, which the essayist stresses, would not be more calculable if we were only able to secure more thorough cooperation in our prenatal studies of the patient.

One must agree with Dr. Garber that it is not always easy to recognize a retraction ring. The examination under deep anesthesia with ether, though I personally prefer chloroform, will, in most cases, enable one to differentiate a constriction from a retraction (Bandl) ring. Since the clinical handling of the case is dependent upon a correct diagnosis, this is of utmost importance. The author stresses the factors which should cause the attendant to suspect dystocia due to uterine rings. In this presentation the management of this condition is very properly divided into the prophylactic and active. I would particularly stress the importance of the prophylactic care of these patients. This is brought out by the essayist. The active treatment brings us immediately into debatable territory. Where we find a generally contracted and board-like hardness of the uterine musculature, the treatment with analgesics and supportive measures for the mother is usually successful. An elastic binder properly applied aids greatly in maintaining corrections of malpositions. With contraction rings the problem may be more difficult. Here one should pursue the same course for a reasonable period of time. It is in this type of case that I have secured the most satisfactory results from the use of epinephrine. In this condition, one is justified in employing manual methods of delivery with more confidence of success and less danger of uterine rupture.

In the active treatment of the true Bandl ring, I feel constrained to take issue with the essayist. In this particular type I feel, after personal experience, that abdominal section should be done but not as a last resort.

Dr. Garber is to be congratulated upon the outcome of his cases. This is exceptional and one cannot but question whether or not such satisfactory results would attend the universal handling of these complications after this technic.

Dr. Jos. W. Reddoch, New Orleans, La.—The frequency of these conditions is not known, for oftentimes

their presence is probably not recognized, especially in more or less mild cases, and even in the severe ones usually only after labor is arrested and after intrauterine examination. Rudolph has shown that an internal examination is necessary in 91 per cent of the cases for making the diagnosis. Indeed, most of us forget their possibility, and therefore lose babies and damage or lose mothers who might have been saved had the condition been recognized before the forced delivery.

McKenzie found uterine rings as frequent as one in 391 deliveries or 36 in 14,080 deliveries at the Louisville City Hospital. There was no marked preponderance for primiparae, but they were slightly more frequent in this group. No effort was made to differentiate the retraction (Bandl's) from constriction (contraction muscular) rings. Seventy per cent occurred in occiput posterior cases. That malposition plays an important part in the production of the pathologic retraction ring can hardly be disputed, it being the result of the effort on the part of the uterus to pull the internal os over the presenting part. It is seen especially in persistent occiput posteriors, transverse and the other malpresentations and in borderline pelves, and is probably equally frequent in multiparae and primiparae. The constriction ring, on the other hand, may be seen in malpositions, malpresentations and contracted pelves, but may also occur in nervous women, especially those having their first baby, if the first stage of labor has not been properly conducted, possibly if oxytoxics have been used injudiciously with too early an effort to bear down, before the first stage is over. The constriction ring is located at a narrow part of the fetus, such as the neck in cephalic presentations, or about the lower part of the abdomen above the iliac crests in breech cases.

The treatment should first be preventive in both cases. This includes adequate sedation during the first stage, ample nutrition, and abstinence from oxytoxics after labor has started. In long cases, 2000 to 3000 c.c. 5 per cent glucose by vein is invaluable. After the retraction ring has developed possibly 5-10 minims of 1-1000 epinephrine hydrochloride HCl with deep ether anesthesia correction of the malposition and forceps or version for delivery will suffice. For the constriction ring a rest period with morphine grains 1/6-1/4 and atropine 1/150, will often be rewarded with a relaxation of the ring when followed by ether anesthesia. Sedation in the form of paraldehyde, or otherwise will possibly be of value. Certainly laparotomy should be the last resort for those patients. After intrauterine manipulation and necessarily long labors they are not suitable for cesarean section. The Porro or Portes operation should be considered when necessary. The most important thing in handling either type of ring is *not* to attempt vaginal delivery until the rings have relaxed.

As a part of prenatal care cases should be adequately studied with pelvimetry and the accurate determination of presentation of the fetus at the time of the onset of labor. Transverse and face presentations may be indications for cesarean section especially in primiparae. When the back is found on the right side, an occiput posterior should be suspected and therefore contraction (constriction) or retraction ring should be looked for, and precaution taken to make the labor as easy for the patient as possible. Here I agree with Dr. Garber in suggesting early intervention, our practice being 1½-2 hours in the second stage, if the mother and baby's condition warrants. Cases with borderline pelves should be watched carefully no matter what the position, and I believe we should be allowed to broaden our indications for cesarean section rather than bend backward to find them. Certainly elective section offers the baby and mother better chances than one complicated by hours of tedious labor and many vaginal, not to mention intrauterine, examinations.

THE MANAGEMENT OF HEAD INJURIES*

By GILBERT C. ANDERSON, M.S., M.D., F.A.C.S.
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At the 1937 meeting of the Louisiana State Medical Society, Gray and Gray[7] of Monroe used as their reason for another paper on head injuries the increasing frequency of such accidents. The figures which they quoted are impressive. In a single year 36,000 persons were killed in automobile accidents, 107,000 hopelessly maimed, 1,170,000 seriously injured, and $1,600,000,000 lost in earning power. For the first six months of 1937, the National Safety Council reports 17,200 deaths from automobile accidents, an increase of 13 per cent over the corresponding period of the previous year, and predicts that at the present rate of increase the yearly total will reach 50,000 by 1950. The increasing number of automobile accidents has made the subject of head injuries a matter of grave concern both to the general surgeon and to the general practitioner. It is they who, because of circumstances, must assume the responsibility of the large majority of such cases today, and they must realize that their handling of the patient during the first twenty-four hours after the accident may turn the tide of life or death for him.

The free and frequent discussion of the management of head injuries at medical meetings and in the literature is a fine and healthy sign. On the other hand, the situation becomes confused for the general practitioner when he finds authorities of equal eminence disagreeing sharply in their practices in certain important phases of treatment. The chief disagreement centers about the use of dehydration therapy and the use of spinal puncture as a diagnostic and therapeutic

*Read in General Clinical Session, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

*From the Department of Surgery, Louisiana State University School of Medicine.

measure. On the other principles of treatment there is more agreement.

Although the classifications of head injuries are numerous, a simple and useful grouping includes concussion, contusion, laceration, and hemorrhage, which last includes extradural hemorrhage, intradural hemorrhage, and several less frequent varieties. Any one of these conditions, it is important to remember, may be accompanied by edema and compression of the brain.

Skull fractures are classified according to their situation, as of the vault, of the base, and of special bones; they are classified according to their character as linear, comminuted, depressed, simple, or compound. In one sense the actual fracture of the bone is not very important, for damage to the brain and not to the bone is responsible for death, paralysis, convulsions and the whole grisly train of sequelae which follow head injury. On the other hand, the consequences of the fracture may be very serious, and its importance must not be discounted. Thus a depressed fracture may produce dangerous pressure. Other types may be the direct cause of hemorrhage, as from the middle meningeal artery, or may furnish a direct or indirect route of infection through the ear or sinuses. A wide, bursting fracture may be actually therapeutic, in that it produces adequate decompression.

Very little need be said concerning concussion. In fact, very little can be said if one sticks to the known facts and avoids theory and conjecture. The term is clinical and not pathological. No one has yet determined exactly what happens when a patient receives a relatively slight injury, loses consciousness for a short time, perhaps develops a severe headache, and then goes on to rapid and complete recovery. Contusion and laceration, while pathologically distinct, clinically are degrees of the same condition. Laceration naturally implies a greater degree of trauma than contusion, but it is doubtful whether the conditions could be distinguished from each other except for the presence of blood in the spinal fluid in laceration. Both extradural and intradural hemorrhages may be strictly localized lesions, and both, when they are typical, which is not always the case, are associated with clear cut clinical syndromes. Extradural hemorrhage commonly occurs from the middle meningeal artery and intradural hemorrhage as a subdural hematoma. There is always some bleeding associated with a laceration of the brain, the blood tending to collect about the base and in the cisterns. Less often hemorrhage is of the intraventricular variety or occurs from torn sinuses or from veins crossing from the cortex to the sinus.

The brain, like any other soft tissue, may become edematous as the result of trauma, or as the result of hemorrhage caused by the trauma. The cavity in which it lies is protected by nonexpansile bone, and increased intracranial pressure and compression of the brain are inevitable results: the edema produces an actual increase in the volume of the brain, and the blood lost may itself encroach upon the limited space within the skull.

Before passing to details of treatment, certain general statements should be made. In the first place, it is most important that the patient should be treated as nearly as possible where he was hurt. He should not be transported over long distances, even to secure more expert care. The specialist must come to him; he must not be taken to the specialist.

In the second place, the patient in shock must be treated for shock, regardless of any other consideration. His life must be saved first, his injuries cared for later, for if he fails to emerge from shock, no other treatment will be necessary. Many patients who die in the first few hours after a head injury die of shock and not of the injury, though that fact is very commonly overlooked. Physical examination during this period is limited to such obviously imperative measures as an investigation to discover possible active hemorrhage, which is often the cause of the shock, a punctured lung, a ruptured viscus, or broken neck. According to Adson,[1] active hemorrhage is the only complication which warrants treatment at this time.

The shock which is the accompaniment of many head injuries does not differ in its manifestations from ordinary surgical shock and requires the same therapeutic measures. These include the application of external heat by means of warm blankets, hot water bottles and electric pads; black coffee by proctoclysis; the use of such stimulants as caffeine sodium benzoate, camphor, alphalobelin and preparations of digitalis; glucose by vein; and, if there has been active bleeding, transfusion as soon as a donor can be secured.

After the patient has recovered from shock, a careful physical examination should be made, including all areas of the body. An unconscious patient may be paralyzed from a spinal injury, and the more obvious head injury may be of

lesser importance. Neurological examination is naturally more satisfactory in a conscious than in an unconscious patient, but even from an unconscious patient much can be learned.

The eyes should be examined carefully, and it should be noted whether the pupils are equal, dilated, contracted or fixed. A dilated pupil points toward the side of the injury, contracted pupils indicate basal hemorrhage, and dilated and fixed pupils are always of serious import. Early examination of the fundi, while it should not be omitted, does not yield much information, but after a few hours the veins may be engorged, and later chocked disks or blurring of the disk margins may indicate an increase in intracranial pressure. Even in coma paralysis of the extraocular muscles may be seen, and if the coma is not too deep, pressure on the supraorbital nerve may demonstrate facial weakness or paralysis. If the patient is restless, the limbs should be carefully inspected to determine their relative motility. If he is quiet, the limbs should be raised and dropped, to determine the degree of tonus, which is further indicated by the response of the tendon reflexes and the presence of clonus or of the Hoffman or Babinski reflexes. Roentgenological examinations should be made routinely at this time in all cases.

The unconscious patient demands the most detailed observation, especially as to the deepning or lessening of his coma. Temperature, pulse, respiration and blood pressure should be checked at half hour intervals. Temperatures above 102° or 103° F. are alarming in proportion to the elevation. If compensation has occurred, the pulse is slow and regular and the respirations slow and deep. A widely fluctuating pulse, and rapid, shallow and irregular respiration indicate an increase in intracranial pressure. The blood pressure tends to follow the pulse and respiration to a certain point, but a marked drop after a steady rise is a sign of broken compensation and impending death. Blood pressure in elderly subjects is rather difficult to evaluate, for a rising pressure may be the return to the usual hypertensive levels after the fall due to shock and hemorrhage instead of the increasing pressure it would mean in younger normal subjects.

Constant and expert nursing care is essential during this period of observation, for no detail must be overlooked. If improvement does not occur, it may be assumed that the condition is probably more than mere concussion. For contusion or laceration nothing can be done, and the problem is chiefly the relief of intracranial pressure.

Opinions differ as to the methods by which this result should be accomplished. Fay[6] is the outstanding proponent of the dehydration method, and it is widely used, though usually with modifications which make it considerably less drastic than was originally proposed. Dandy,[4] ably seconded by Coleman, advocates subtemporal decompression, on the ground that it will save a third of the 30 per cent of patients with head injuries who would die without treatment. He condemns both dehydration and spinal puncture.

Dehydration may be accomplished by a limitation of the intake of fluids, as little as 800 to 1,000 c. c. for each 24 hours; by the use of magnesium sulphate orally in one ounce doses and rectally in two ounce doses every four to six hours, in the latter case with the addition of a small amount of paregoric to allay irritation of the rectal mucosa; and by the intravenous administration of hypertonic solutions. Vigorous dehydration is possible under this regimen, but many who speak with authority consider it far too drastic, and the risk of over-dehydration is clear. A safer course would seem to be the employment of the method less vigorously for 24 to 36 hours, with a slow return thereafter to the freer use of fluids.

Spinal puncture may be used solely as a diagnostic measure, or with the dehydration method as a therapeutic procedure. If it is done, with the patient on his side and the head level with the lumbar spine, the pressure registered by the manometer should be the intracranial pressure, and the degree of concentration of blood in the fluid should roughly indicate the extent of the hemorrhage. This does not hold, of course, if the subarachnoid spaces are blocked. Although drainage of the spinal fluid has never been demonstrated either to increase or to decrease intracranial bleeding, it is perhaps wiser, if the fluid is extremely bloody, merely to determine the pressure and withdraw the needle at once. The puncture may be repeated in two or three days and drainage carried out if the fluid proves to be clearer. After three to six such drainages the fluid usually becomes entirely clear. The rationale of this method is indicated by Bagley's[3] work on the deleterious effects of blood in the cerebrospinal fluid. There is no doubt that spinal drainage lowers intracranial pressure, but the effect is too transient to be of value without the employment of auxiliary measures.

Restlessness must not be tolerated in these patients, for they become fatigued very easily. Barbiturates are usually effective, with the substitution of codeine if they are not. Morphine is undesirable because it further depresses the already embarrassed respiratory center, and may lull the surgeon into a false sense of security by masking fresh symptoms. On the other hand, it is sometimes the lesser of two evils.

Feeding should be begun at the end of 24 to 36 hours, through the nasal tube if the patient is in coma and cannot swallow. Bowel elimination is not a problem if the dehydration method has been employed. Otherwise, both the bladder and the rectum must be emptied. Involuntary defecation and urination are signs of grave brain injury.

The indications for surgery are usually clear-cut. Compound fractures, depressed fractures and localized hemorrhage require it, and it may be necessary for decompression. Compound fracture is not an acute emergency, and needs no treatment until the shock is completely overcome. Then the operation may vary from simple cleaning and suturing of the scalp wound to removal of bony fragments and other substances from the brain, and wide debridement, sometimes of the brain itself.

If all patients could be handled in medical centers, under expert neurological supervision, it is beyond question that some slight depressions over silent areas might be safely let alone. The average general practitioner, however, had best make it a working rule to elevate all depressed fractures, since it is often surprising to find more serious damage than is shown by the x-ray; in some cases the injury is revealed as extensive comminution of the inner table. Again the operation is no emergency, and the patient will usually be benefited by delay.

Localized hemorrhage usually occurs over the hemispheres. The most frequent extradural hemorrhage is from the middle meningeal artery and is a true surgical emergency, in which the delay of a few hours may mean death. In this condition there is a history of trauma and unconsciousness followed sometimes, though not always, by a lucid interval, which in turn is replaced by coma, convulsions or hemiplegia. Subdural hematoma usually manifests its presence weeks, months or even years after a trivial injury, which is sometimes so slight as to have been forgotten. The symptoms are chiefly those of increased pressure, possibly accompanied by hemiparesis or hemiplegia, with upper motor neuron signs. If the hematoma is not found at operation in the expected location, the opposite side should be explored.

In a small group of patients who fail to improve in spite of any sort of conservative treatment, including dehydration, subtemporal decompression should be done. The operation should be done on the right side in right-handed persons, and repeated on the other side if no improvement takes place within a reasonable time. Ody's[8] suggestion that decompression and drainage of the excess fluid be done by the posterior approach seems logical.

All the measures suggested in this paper can be carried out in small hospitals, and should be; as we have already pointed out, the less such patients are moved about, the better. Prolonged rest in bed should follow all head injuries, the period varying from three to twelve weeks, or longer, depending upon the extent of the injury. The period of unconsciousness after the injury serves as some index to this. The scope of this paper does not include the discussion of the complications or sequelae of head injuries.

SUMMARY

(1) Head injuries are of increasing importance because of the increasing number of automobile accidents.

(2) Head injuries can be treated in the small hospital, and should be, for such patients run an increased risk when they are transported long distances.

(3) Close observation, careful study and expert nursing care are fundamental requirements.

(4) Regardless of the nature of the injury, the treatment of shock is always the primary consideration.

(5) Dehydration and spinal puncture are valuable methods of treatment in many, though not in all cases. Drastic use of these methods is open to decided question.

(6) Surgery is indicated in compound fractures, depressed fractures, localized hemorrhage, and some cases of prolonged coma, but only middle meningeal hemorrhage is a surgical emergency.

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LATERAL SINUS THROMBOSIS COMPLICATING MASTOIDITIS*

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The occurrence of lateral sinus thrombosis remains one of the most important and serious problems which confronts the otologist. Voluminous reports have been rendered and innumerable cases, successful and unsuccessful, have been published. It is one of the commonest complications of mastoiditis, and one would imagine from the numerous and rather frequent reports that it is rather a common condition, but in reality it occurs in only a small percentage of cases of mastoiditis.

Incidence.—Meltzer,[1] in a review of cases at the Massachusetts Eye and Ear Infirmary from 1921 to 1932, reports 161 cases of sinus thrombosis, preoperative diagnosis, out of 4,961 cases of mastoiditis, a percentage of 3.2. Coates, Ersner and Persky[2] report 14 cases from a series of 969 acute and chronic mastoids, or a percentage of 1.4. White reports 1.8 per cent of cases from 588 mastoids. Wannamaker notes that in general sinus thrombosis occurs in 3 to 6 per cent of all operative cases. The mortality rate varies from 20 to 40 per cent in the majority of instances, depending a great deal upon the severity of the cases when first seen, number reported and other complications.

Sinus thrombosis is more frequently associated with acute mastoiditis, occurs more often in males and between the ages of 6 and 30, the greater number of cases being between the ages of 11 and 20. The right lateral sinus is involved more than the left. This is attributed to the fact that the right lateral sinus is usually larger than the left, the knee of the sinus extends further inward and forward and lies deeper in the mastoid cavity, thus bringing it in closer contact with the mastoid cells. The superior longitudinal sinus communicates mainly with the right lateral sinus and the straight sinus with the left, accounting for the variation in size. There are various anomalies occasionally present which may account for atypical symptoms. Eisner and Myers have had three cases in which the lateral sinus was absent on one side.

The infrequency in infants and young children is thought to be due to the relatively less important role of the sinus in relation to the mastoid cells than when the mastoid is fully developed. When thrombosis occurs the pathway of infection is more likely to be from the hypotympanic space to the jugular bulb.

Pathology.—The extension of infection to the lateral sinus with resulting thrombosis occurs in one of two ways, depending on the type of existing mastoid infection, whether it is coalescent, hemorrhagic or chronic. When associated with the coalescent type of acute mastoiditis or chronic mastoiditis, the infection usually extends to the sinus by direct contiguity, through the progressive destruction and necrosis of bone. Granulations are formed on the external surface of the vein in defense of the spreading infection. If the invading organism is very virulent and overcomes the bactericidal forces of the individual, the infection progresses through the walls of the vessel to the intima with resulting thrombus formation. The external wall of the sinus becomes thickened and discolored, presenting a reddish or grayish red appearance, and in advanced cases with extensive thrombosis no pulsation can be detected.

In the acute hemorrhagic cases, the infection reaches the lumen of the sinus usually through a progressive intravascular thrombosis. The external surface of the sinus reveals few, if any, changes, thus giving practically no information as to the process taking place when the sinus is exposed. The thrombus in these cases is less firmly attached to the intima and breaks loose into the general circulation more easily.

The question of thrombus formation has been the subject of considerable controversy and different theories have been advanced. Talkes believes that it is not necessary for bacteria to penetrate to or through the intima in order to produce a thrombus, but that the toxic action of bacteria may be capable of producing a clot

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

when the bacteria are in the walls of the sinus. Leutert, on the other hand, claims that inflammatory changes of the intima are necessary, the bacterial toxins only making the process easier. Hayman believes that they may form by either method, may be sterile at first and later become infected.

Thrombi may be intramural or obturating, the latter becoming so extensive as completely to block the sinus. Organization of the thrombus may occur or organization and destruction may take place simultaneously. In most cases the central portion of the thrombus is infected, the periphery being sterile, though the entire clot may be infected. Thrombi may develop either in a central or peripheral direction, the ends usually tapering off to a point.

Bruner and later Boies have differentiated sinus thrombosis into three distinct types:

(1) That in which there is evidence of its presence at the time of operation.

(2) Latent, in which the condition becomes manifest after and because of the operation. It is thought the operation hastens the process by disturbing previous thrombotic veins connecting with the sinus and by opening up other veins which may become thrombosed and spread the infection to the sinus. A phlebitis probably exists before the operation.

(3) Postoperative, in which symptoms become evident in a period well after the mastoid was performed, at least two weeks.

Hemolytic streptococci are the offending organisms in the large majority of cases, though staphylococci and pneumococci have occasionally been reported.

SYMPTOMATOLOGY

(1) *Temperature.*—The most characteristic and constant symptom is a septic type of temperature, with wide excursions, occurring in the course of a middle ear or mastoid infection. There may be periodic elevations which in the presence of other signs are quite significant. Between elevations the patient is apparently very comfortable and experiences a sense of well being. This has been quite evident in all of our cases and I think one of the most important symptoms. In many cases, even at the height of the temperature, there are no complaints from the patient. A sudden elevation of temperature to 104° or over, several days following a mastoidectomy, which becomes septic in nature, is very suggestive of sinus thrombosis even in the absence of other symptoms or laboratory findings.

(2) *Chills.*—The occurrence of severe chills, followed by a marked rise in temperature, make the symptoms even more typical. However, chills are variable and may not be present. There may be only slight rigors, which may or may not be noted, depending on their severity, but nevertheless are quite important.

(3) *Cerebral.*—Symptoms such as headaches, nausea, vomiting, convulsions and signs of meningeal irritation, especially in children, may or may not be present, but in either case they are not dependable from a diagnostic standpoint. In advanced cases where the thrombus is obstructive, ocular symptoms are of considerable importance, being manifested by choked disc or optic neuritis. It has been reported that they are present in 25 per cent of cases of obstructive thrombosis.

(4) *Metastatic Symptoms.*—The development of pain in the joints with abscess formation, superficial abscesses or involvement of more vital structures during the course of a mastoid infection, whether pre- or postoperative, is conclusive evidence of a bacteremia.

(5) Metastasis is not dependent on the disorganization of the thrombus and its entrance into the circulation, for living bacteria, *per se*, may find their way into the blood stream. Kopetzky, several years ago, called attention to the fact that metastatic lesions did not depend on the type or character of the lesion in the mastoid, but rather on the type of organism and its inherent selectivity. When metastasis occurs in the superficial structures as the skin and joints, it is considered a rather favorable complication, with the idea in mind that it may act as a fixation abscess and stimulate the defensive mechanism of the body. However, there are some who believe that the metastatic lesion acts as a focus and tends to prolong the infection. If metastasis occurs to the brain, liver, kidneys or other vital structures, the prognosis is very unfavorable.

DIAGNOSIS

Diagnosis may be comparatively easy when there are a unilateral mastoiditis and typical symptoms, but the ingenuity of the otologist may be severely taxed in the presence of bilateral mastoiditis and indefinite findings. The diagnostic aids which are of value may be considered in the order of their importance:

(1) *Temperature.*—In all cases there is a septic temperature, usually associated with chills

of a varying degree. It must be remembered that this is present in certain cases of mastoiditis, especially the hemorrhagic type, but subsides within 48 to 72 hours following mastoidectomy or with the aid of a transfusion. This is probably due to a phlebitis of the smaller venules and not to any involvement of the lateral sinus. However, if the temperature remains septic, after thorough drainage, it is indicative that the infection has extended to the sinus. As stated previously, it is most suggestive when the temperature becomes septic, several days after an approximately normal course, following a mastoidectomy.

(2) The development of tenderness along the jugular vein, extending from the jugular bulb downward, is of some confirmatory value, especially when occurring in cases of bilateral mastoiditis. This is due to a lymphadenitis along the course of the jugular vein, and has been demonstrated many times at operation, the lymph nodes being found definitely involved.

(3) *Blood Cultures.*—When sinus thrombosis is suspected, a blood culture should be taken at the height of the temperature. It is at this time that the largest number of bacteria will be found in the blood stream, if present. A positive culture is conclusive evidence and of great value, but a negative culture does not mean the absence of thrombosis. Although a blood culture should always be taken, it must not be depended on entirely for diagnosis. The organism may be a slow-growing one and not show up for 72 hours, in which case a great deal of time would be lost. The possibility of contamination must always be kept in mind, and hence the necessity of considering the blood culture in association with other findings. It has been suggested that obtaining the culture directly from the lateral sinus may be of some assistance in diagnosis.

(4) *Blood Count.*—The red blood count and hemoglobin are of importance in that they indicate the presence or absence of a hemolytic process and the degree of its severity. They should be obtained at frequent intervals. The leukocytic count is of very little importance from a diagnostic standpoint. It may vary from normal to 16,000 to 20,000. The Schilling index may be of some prognostic value.

(5) *Tobey-Ayer Test.*—This test is of value only in the presence of a large obstructing thrombus. It is carried out by performing a lumbar puncture and noting the variation in spinal fluid pressure when pressure is applied over each jugular individually and simultaneously. Pressure on the uninvolved vein produces an increase in spinal pressure. This is one of the most valuable diagnostic tests, when positive, not only in making a diagnosis but in indicating the side involved in bilateral mastoid infection. It is of no value in cases of bilateral sinus thrombosis.

(6) *Griesinger's Sign.*—This sign, characterized by edema over the mastoid and extending to the temporal region and the eye, may be of some value when present. It is due to thrombosis of the emissary vein and engorgement of veins which drain into the internal jugular.

(7) Ocular symptoms, as previously mentioned, are helpful when present but of no importance when absent. They are very inconsistent, except in cases of intracranial complications.

(8) Last but not least is the direct examination of the lateral sinus. The lateral sinus should be completely exposed, and the condition of its external wall determined. Fortunately, most cases are due to the spread of infection by direct contiguity, and the appearance of the sinus will be of considerable value in determining the diagnosis. When bilateral mastoiditis exists, if the sinus on one side appears normal, then the other side should be examined. If both sides appear normal and there is a definite blood stream infection, one indeed has a difficult problem to decide. A careful consideration of all available information, including the severity of preceding infection in the mastoid, will usually lead to a correct diagnosis. The diagnosis depends, not only on the positive findings, but also on their proper interpretation and judgment of the otologist.

(9) *Metastatic Lesions in Course of Mastoid Infection: Complications and Prognosis.*—When the infection is properly and thoroughly drained and a clean slot established between the site of the lesion and the torcular, a favorable prognosis may be offered. If the inner or lateral walls of the sinus are involved, which is more apt to occur when there is free pus in the sinus, there is great danger of brain abscess or meningitis, with resulting fatality. Metastasis to vital organs with abscess formation offers a poor prognosis.

TREATMENT

Treatment should be supportive and surgical. The supportive or medical management consists in maintaining proper nutrition, frequent small transfusions and immunization. Transfusions of 150 to 250 c. c. should be given every few days,

depending on the general condition of the patient. They are given not only to improve the anemia, but to increase the general resistance of the patient and dilute the infecting organisms. The consensus of opinion is that there is very little difference whether the citrated or direct methods are utilized. We prefer whole blood direct transfusions after very careful matching of the blood of the donor and recipient.

Within recent years serum therapy has become quite popular in the larger clinics, especially in cases where hemolytic streptococci are found. It is claimed by Dorst, Kalmer and other leading serologists that excellent results are obtained if it is given early and that bad results are due to waiting too late before it is administered. When serum and transfusion therapy are both being used, the donor should be tested for sensitivity to the serum being given the patient, for if this is not done, a severe anaphylactic reaction may occur, due to the patient's being passively sensitized. Though serum therapy has not been generally accepted and utilized, those sponsoring it believe the most successful and effective medical treatment lies in the combined use of serum and transfusion therapy.

We have used in some cases the serum from a patient who has recovered from a similar type of infection with good result.

The intravenous use of dyes, which not many years ago swept the country with enthusiasm, has now practically been discarded. Pregl's iodine and other antiseptic solutions have met with a similar fate.

The surgical procedure in sinus thrombosis is at present the subject of wide controversy. Since Zaufal, in 1880, first advocated jugular ligation to isolate an infected clot in the lateral sinus from the general circulation, the operation has been performed innumerable times and is still considered by the large majority of otologists as the classical operation of choice.

As soon as the diagnosis is determined, the internal jugular should be ligated, the lateral sinus blocked well above and below the involved area, and then carefully incised. Any clot or infected material should be thoroughly removed. The packing is then removed from above and below to determine if free bleeding exists and if so, it is immediately repacked. A drain is then placed in the sinus. If free bleeding is not obtained, it is necessary to extend the operation in either direction until normal sinus, free bleeding and sufficient drainage are secured. When a clot is not found on incision of the sinus it does not necessarily mean that the diagnosis was in error, because a very small intramural clot may have been present and washed out with the flow of blood.

The question of whether to ligate above or below the facial vein has been debatable for years, but the general opinion of those favoring ligation is that it makes little difference, in view of the extensive venous anastomosis, so long as the main conduit is blocked, which is the internal jugular. However, there are still many who prefer ligating above the facial vein.

For many years the question was whether to ligate or resect the jugular vein and opinion was fairly well divided. But within recent years a few prominent otologists have come forward to oppose ligation or resection. They question that there is a real value to jugular ligation and call attention to the fact that cases of sinus thrombosis without apparent symptoms have been discovered by chance during mastoid operations or at postmortems, indicating that nature is capable of walling off and taking care of the infection; also that septicemia and metastasis quite often occur following ligation, indicating that ligation cannot be depended upon to check infection from entering the blood stream. Especial emphasis is placed on this argument by those opposed to ligation as they point out the nature of the extensive collateral venous circulation of the head. Ligation of the jugular, even above the facial, does not block off the superior or inferior petrosal vein, emissary or post condyloid veins, through which infection may spread to the other venous channels of the head via basilar and cavernous sinuses. It has also been demonstrated that it is possible to inject all the cranial sinuses via the external jugular vein with the internal jugular vein ligated.

Richards[3] called attention to these facts in a recent article and also quoted published cases by Korner and Krepusca. In Korner's cases about the same percentage of cures were obtained without ligation as with ligation. In Krepusca's report of 295 cases, 19.6 per cent were cured with ligation and 46.7 per cent were cured without ligation. This included cases of phlebitis and thrombosis. In 148 cases of thrombosis 109 were treated by ligation with a mortality of 60 per cent, while 39 cases were treated without ligation with a mortality of 33 per cent. In a series of 25 cases reported by Richards, 19 were treated by ligation with a mortality of 37 per cent, while 6 were treated without ligation, with no mortality. From these reports it would seem

that the prognosis is more favorable without ligation, but in a comparison of statistics one must always consider the difference in severity of infection. In 48 cases reported by McCarthy[4] and 161 cases by Meltzer, those making the most rapid recovery were operated upon and the jugular ligated within 2 to 5 days following the initial symptoms. But as Korner says, "It is best to adopt the method and extent of operation to the findings in each case."

From my own limited experience, I firmly believe that ligation is the procedure of choice and the remark that a surgeon may regret not having ligated the vein, but seldom regrets having done so, still holds true.

CASE REPORTS

In a series of 260 cases of acute and chronic mastoiditis at the Henrietta Egleston Hospital, in children between the ages of 2½ to 10, within the past eight years, there have been 7 cases of lateral sinus thrombosis, or a percentage of 2.6. There was a case of emissary thrombosis, left side, presenting typical Griesinger's sign, symptoms of which appeared 2 days following simple mastoidectomy. The temperature ranged around 101 to 103° for a week and then up to 105°, the first sharp elevation. Blood cultures were negative. A transfusion of 250 c. c. citrated blood was given at this time and the temperature and edema gradually subsided. The patient was in the hospital for nearly 2 months, running a low grade temperature, but was discharged completely well. Of the 7 cases to be reported, 4 occurred on the right side, 2 on the left and one was undetermined. A positive blood culture was obtained before ligation in 5 cases, after ligation in one though subsequent cultures were negative, and they were negative in the other case. In 2 cases free bleeding was obtained on incision of the sinus, but no thrombus could be demonstrated, though the external wall was considerably thickened, discolored and granulations covered the outer surface. A definite thrombus was demonstrated in three cases and a disorganized thrombus and free pus in another case. The jugular was ligated and the lateral sinus opened in all but one case, in which the site of the lesion could not be determined. This patient had a positive blood culture at one time, and ran an extremely septic temperature for nearly 2 months before mastoidectomy was performed. The patient was admitted to Egleston Hospital 2 months after the ears had been discharging. There were 2 cases presenting metastasis to the hips before operation. A secondary anemia and hemolytic streptococci were present in all cases. Five cases recovered following jugular ligation and drainage of the sinus and 2 died, giving a mortality rate of 28 per cent. The two fatalities were cases admitted with positive blood stream infection, one with metastasis to the hip, and both developed meningitis within 6 days, which was the cause of death.

Case 1.—J. C., a little girl 2½ years of age, was admitted May 24, 1930, with a temperature of 106° and evidence of left acute mastoiditis. There was a history of pain, slight discharge and fever for one week. Simple mastoidectomy was done the following day. Positive blood culture of short chain streptococci was reported the same day. A coalescent mastoid was found with large perisinus abscess. Three days later, May 28, there were positive Brudzinsky, Babinsky and Kernig reflexes. The temperature was very septic. Lumbar puncture showed cloudy fluid, negative Tobey-Ayer. Jugular ligation was done. There was free bleeding on incision of the sinus. The following day, May 29, cervical laminectomy was done. Temperature was 101 to 105° until death on June 6, 1930, nine days later. Blood cultures taken May 31 and June 2 were negative. Four transfusions and Pregle's iodine were administered. Short chain streptococci were obtained from the ear, mastoid, lateral sinus and spinal fluid.

Case 2.—E. B., a girl aged 4, was admitted April 9, 1931, with right subperiosteal abscess, temperature 100°, and a history of discharging right ear for three weeks following measles. She had had acute suppurative arthritis of the left hip for 1 week. April 10, 1931, right simple mastoidectomy of the coalescent type was done, with no exposures. The left hip was drained. The temperature remained elevated. April 11, blood culture was positive. The sinus was exposed and perisinus abscess present. The jugular was ligated and sinus incised, demonstrating clot and seropurulent secretion. A stormy course and septic temperature followed. April 17, 1931, she had nausea, vomiting and twitching of the right arm. Reflexes were negative. Lumbar puncture showed cloudy fluid. April 18, 1931, the patient died. Postmortem showed extensive exudative meningitis and bloody exudate in all the intracranial sinuses. Short chain streptococci were present in the ear, mastoid, hip, lateral sinus, blood stream and spinal fluid. Blood culture was positive throughout. Six transfusions, Pregle's iodine and metaphen were given with supportive treatment.

Case 3.—J. M. H., a girl aged 6, was admitted February 21, 1934, with a temperature of 104° and history of purulent acute bacillary otitis media for ten days. Roentgenogram showed moderate reaction, with no necrosis. February 28, there was mastoid tenderness on the right and temperature 98 to 105°. Blood cultures were negative. Right simple mastoidectomy disclosed pus and early necrosis. The sinus, which was exposed, was normal in appearance. Temperature ranged from 101 to 102° for 7 days. March 7, left simple mastoidectomy showed pus and early necrosis; no exposures were made. Gradual decline of temperature occurred until March 15, when it suddenly became septic, 99 to 105°.

March 21, the temperature remained septic. Blood culture was positive. Tobey-Ayer showed involvement of the right lateral sinus. March 22, the right jugular was ligated and sinus incised; a fibrinous exudate was present. Free bleeding occurred from above, but not below. Culture from the right mastoid disclosed short chain streptococci, from the left mastoid long chain streptococci. Culture from the sinus and blood stream showed long and short chain streptococci. March 30, the temperature remained septic, 99 to 104°. Blood cultures after March 24 were negative. The sinus was further exposed toward the torcular. It was discolored. It was reopened and a thrombus was seen to be present. It was packed well above the area. The temperature was septic for 5 days, then there was a gradual decline. She was sent home April 20, 1934, with a temperature of 99°, otherwise normal. Transfusions were done March 3, 9, 21, 26, 30 and April 4 and 9.

May 15, 1934, she was readmitted with a temperature of 99 to 100°, headache, nausea and vomiting, and slight choking of the discs. She was discharged June 29, slightly improved. She was not vomiting, but the 99° temperature was constant. For observation, she was readmitted May 17, 1934, with headaches, vomiting, the temperature 99 to 100°, choked discs and homonymous hemianopsia. Reflexes were negative and spinal fluid negative. She was thought to have a right temporal lobe abscess and was kept under observation. Symptoms gradually cleared up after several months.

Case 4.—T. L., a boy aged 4, was admitted February 23, 1935. His temperature was 104° with a history of bilateral mastoidectomy 10 days previously. The temperature had been markedly septic 3 days before admission. Blood cultures were negative. There was a history of the left mastoid's being worse. There was slight tenderness along the course of the left jugular. The left mastoid was reopened, the sinus exposed, and seen to be discolored and thickened. The jugular was ligated and sinus incised. Thrombus was demonstrated February 27. The temperature had remained septic, though declining. There was a sudden elevation to 105°; the neck was swollen; it was incised and pus drained. Blood culture was negative. March 1, 1935, transfusion was done. The temperature was gradually declining. There were short chain streptococci in the sinus. March 30, the patient was discharged, mastoid practically healed.

Case 5.—F. W., a boy aged 6, was admitted February 27, 1935, with a temperature of 101°. He had a history of scarlet fever December 18, 1934, complicated by bacillary purulent acute otitis media December 25. Myringotomy was done and a septic temperature of 100 to 105° followed. January 11, 1935, he had a chill and could not speak plainly for one week. January 14, a positive blood culture was obtained, of short chain streptococci. January 20, an abscess of the right hip was drained. He had two convulsions, involving the right hand and arm. February 7, an abscess of the left hip was drained. His temperature was markedly septic until February 9, 1935, when it subsided and ranged between 100 and 101°. February 28, the ears were draining. There was no definite mastoid tenderness. Roentgenogram showed cloudiness of the mastoids and indistinct cellular outline. The temperature was 100 to 101°. He was emaciated and anemic. He had had four transfusions between January 11 and February 27. The Tobey-Ayer test was negative and there were no complaints. On March 4, bilateral simple mastoidectomy was done. There were free pus and granulations in the right mastoid. The sinus was exposed and seen to be normal in appearance. There was subsiding mastoiditis on the left. The sinus was exposed and was normal in appearance. The temperature remained 99 to 100° with no occasional slight elevation until he was discharged April 7, 1935. Repeated blood cultures were negative. He became completely well several months later. Transfusions and supportive treatment were used.

Case 6.—B. T., a boy aged 10, was admitted June 10, 1936, with a temperature of 103°, complaining of pain behind the right ear. He had a history of right simple mastoidectomy March 25, 1936, with no exposures and fairly normal convalescence. He had a coalescent type of mastoid, the wound not quite healed. The temperature became septic and elevated to 104°. Blood cultures were negative. He had a transfusion on June 15, 1936.

June 17, the temperature was elevated to 105° and he had profuse sweats. The mastoid was reopened and sinus exposed; the wall was discolored, covered with granulations and thickened.

The jugular was ligated and sinus incised; there was free bleeding, no thrombus was demonstrated. June 23, blood culture of June 22 was reported positive for hemolytic short chain streptococci. The temperature remained septic; he had profuse sweats and slight chills. There was periodic swelling of the right eye and preauricular area. He had cyanotic attacks and was very restless.

June 26, his temperature was 103 to 105°. The right eye and face were swollen. He was cyanotic at intervals. Transfusion was done July 1, 1936. The preauricular area was swollen, tender and fluctuant. His temperature was 104°; pus drained through the mastoid wound.

July 3, the temperature gradually declined to 99°; swelling was practically gone; transfusion was done. July 19, he was discharged in good condition.

Case 7.—B. H., aged 17 months, was admitted May 8, 1936, his temperature 103° with a history of discharging ears since April 21, 1936. On May 9, simple mastoidectomy was done. He had the coalescent type of mastoids; no exposure was made.

May 11, 1936, he had a generalized fine rash. He was given a streptococcus antigen. On May 13, his rash had practically disappeared. His temperature had been subsiding until a sharp elevation to 105° occurred on this day. May 15, his temperature was very septic. Following transfusion, he had a severe reaction on May 17. Positive blood culture was taken on May 15 and 16. Tobey-Ayer test was negative. May 18, the right mastoid was reopened and the sinus exposed. The external wall was covered with granulation, discolored and thickened. The jugular was ligated; sinus incised; thrombus was present.

May 21, his temperature was slight and subsiding, though septic. Transfusion was followed by gradual decline of temperature. June 12, he was discharged, his wounds nearly healed.

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DISCUSSION (*Abstract*)

Dr. William A. Wagner, New Orleans, La.—In discussing lateral sinus thrombosis complicating mastoiditis differentially, one cannot help considering the subject of sepsis. Immediately the question arises as to whether one might be dealing with otitic sepsis with its origin from the middle ear, or from the mastoid, in which case the former involves the venous radicals of the middle ear and becomes systemic by means of bacteremic, whereas the latter, the lateral sinus may be embolic in its systemic extension. Also one must take into consideration the question of the general infection associated with the otitic complication, and often its cause, which might be an acute infectious disease or a septic tonsillitis both of which may be associated with sepsis.

From the pathologic point of view one must also take into consideration the question of whether the sepsis is associated with a phlebitis of the middle ear veins or a phlebitis of the lateral sinus with or without a thrombus, and if the sinus is associated with a thrombus, whether the thrombus is sterile or infected, and if a septic thrombophlebitis of the lateral sinus does exist, is the thrombus mural or complete.

In considering these problems one can readily understand why there are no reliable methods of diagnosis, and no methods of localizing the thrombus other than exploration. Consequently, one is occasionally obliged to operate with no definite diagnosis on patients in poor health in spite of the fact that there are several suggestive signs and symptoms to assist the otologist, in addition to such diagnostic tests as the Tobey-Ayer. This test is of value particularly in bilateral mastoiditis. It has been confused with the Queckenstedt test. The Queckenstedt test, although somewhat similar to the Tobey-Ayer test, differs in that the latter is used to confirm spinal cord tumors in which there is obstruction of the spinal canal, whereas, the Tobey-Ayer test is based upon obstruction to the lateral sinus by means of a thrombus.

Sinography, described by Paul Frankner of Stockholm, consists of the introduction of 10 c. c. of an opaque medium into the sagittal sinus after trephining. The head is radiographed two to three seconds later, and the medium is seen on the film in the lateral sinus. The shadow is absent in lateral sinus thrombophlebitis when the sinus is obstructed. Sinography, like the Tobey-Ayer test, has its fallacies, in that a case with absence of the lateral sinus on one side may lead to unnecessary exploration. Consequently, one is more inclined toward a Tobey-Ayer than sinography because the Tobey-Ayer does not require so extensive a surgical procedure.

It has been my experience with exposing the membraneous lateral sinus that pulsation of the sinus is a definite indication for exploration. Ligation of the jugular vein above the common facial vein with incision of the lateral sinus and removal of the thrombus until free bleeding from above and below is obtained, if possible, has been my procedure of choice in surgical management of this otitic complication. It is not the ligation of the jugular vein and obliterating of the lateral sinus that results in death from such a complication. The danger lies in temporizing.

In regard to the medical treatment, the normal metabolism of the body must be maintained particularly in regard to acid-base balance in which one should attempt to preserve the blood volume by sufficient fluid intake. Proper elimination should be encouraged to prevent ketosis, and to avoid kidney damage. In maintaining the fluid intake, the electrolytes, sodium, potassium, calcium and magnesium, should be administered in the form of Hartman's solution, with glucose to maintain the normal blood-sugar level.

Regarding immunity and anemia one must consider blood transfusion and immuno-transfusion, both of which no doubt will elevate the red blood cell content as well as blood plasma in addition to furnishing immuned bodies. If several suitable donors are available, the one with highest opsonic index against invading organism is the preferable. If immune sera are available, the highest titer should be used as recommended by Baum. The use of chemotherapy has not been encouraging and prontosil intravenously in my judgment is not so useful as hypodermatically. Drugs such as prontosil, hypodermatically, "prontylin," and quinine orally are no doubt of value.

The one greatest factor toward ridding the patient of this complication is the removal of all local infectious material within the mastoid region, if possible.

Dr. Murdock Equen, Atlanta, Ga.—Dr. McDougall has presented a subject in which there is still a wide variation of opinion.

At the last meeting of the Academy of Ophthalmology and Otolaryngology held in Chicago a panel discussion on septic thrombophlebitis of the sigmoid sinus was held. Those taking part were Drs. Lee Dean, Tobey, Furstenberg, Kopetzky, Lillie, Hartman and MacKenzie Brown. Knowing as you do how representative these men are, one can appreciate how unsettled is the correct answer to this problem even today, when to operate, when to treat expectantly and what type of operation is best.

It was interesting to find that Dr. Lillie, of the Mayo Clinic, and Dr. Lyman Richards, of Boston, both used citrated blood for transfusion, while here in the South whole blood is almost universally used.

I have noticed that children who have had a jugular ligation seem to develop abnormally. The individual within three or four years becomes much larger than one would expect of a child of that age. I am wondering if others here have made that observation or whether it is a mere coincidence.

GASTRO-INTESTINAL EXPRESSIONS OF AVITAMINOSIS*

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and
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The astounding accretion to medical knowledge in the past relatively few years is in no branch of medicine better exemplified than in the history of the development of present day information concerning vitamins. One hundred and eighty years ago James Lind, the British fleet surgeon, recognized that lack of fresh fruit sooner or later connated scurvy and prevented indirectly this scourge of maritime causation by administering lime juice to ships' crews on long voyages. The next advance did not occur for nearly one hundred years. In 1883, the Japanese appreciated that beriberi was the result of a lack of some intangible substance found in the pericarp of rice. In 1906, Hopkins, recognizing that there were certain food substances necessary to growth and reproduction, dubbed them "accessory factors." Funk, in 1911, first used the word vitamin; an amine necessary to life. This term has clung to medical nomenclature despite the fact that, except for vitamin B_1, none of the identified vitamins present amine groups.

From the early scientific studies of deficiency diseases dating back some thirty years, there has developed a tremendous interest in the subject. At the present time papers on the subject of the vitamins take up much space in medical literature. As illustration, in 1933 I read a paper before the Southern Medical Association in San Antonio on the vitamins. In this contribution I stated that there were indexed in the previous year 900 articles bearing directly on vitamins or some phase of vitaminology and 332 referring to vitamin D alone. In the past year, according to the *Quarterly Cumulative Index Medicus*, there have been approximately 1,000 papers written on this field of science.

As a result of the study of vitamins the original fat-soluble A, water-soluble B and C vitamins have grown to some twenty-seven vitamins definitely established or at least postulated. Many of these have no bearing on the life cycle of man, on his health and well-being, confined as they are to certain factors responsible for the orderly development of the life of the experimental animal, but others are so important that man can not be conceived, born, grow, develop or maintain good health without these vital substances being present in his diet.

The clear-cut syndromes of avitaminosis are rapidly disappearing; "their conquest . . . is a medical epic."* While it is true that gross scurvy is conquered, beriberi defeated and rickets overcome, nevertheless the fact remains that subclinical expressions of these vitamin deficiency diseases are extremely common, and that borderline deficiency expressions are met with in all fields of internal medicine and particularly in the realm of gastro-enterology. There is between the deficiency necessary for the development of the full blown picture of disease and the intake optimal for the body, a broad range in which the symptomatic expression is not typical or is non-specific. Protean and diverse are the alimentary tract symptoms arising as a result of such inadequate or minimal intake of the vitamins.

I propose to present the alimentary tract evidences of dietary flaws under three headings:

(1) The specific deficiencies
(2) Chronic dietary deficiency
(3) Conditioned deficiencies

The first two headings might well be combined because specific deficiencies are rare, chronic dietary deficiencies common, as the food intake deficient in one element is usually deficient in many.

THE SPECIFIC DEFICIENCIES

Vitamin A.—Carotene, provitamin A, may not reach the liver to be converted into vitamin A because of insufficient amounts in intake or through inability to absorb it as a result of gastro-intestinal disease, particularly in the absence of bile. Aside from the better known effects of lack of this vitamin, it has been found that dental developmental faults are common and malnutrition is a constant concomitant possibly dependent upon the invariable anorexia associated with vitamin A deficiency. The loss of appetite in subclinical vitamin A need may be readily controlled by cod liver oil.

Vitamin B.—In the experimental animal, vitamin B deficiency produces in the gastro-intestinal

*Read in Section on Gastroenterology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

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*Eddy, W. H.; and Dalldorf, G.: The Avitaminoses, p. 9. Baltimore: Williams & Wilkins Co., 1937.

tract gastric atony, low acid values, occasionally gastric ulceration, pyloric obstruction and intestinal disturbances. In man, vitamin B complex, when insufficient, definitely causes anorexia and profoundly affects intestinal motility. It may play an etiologic role in the production of chronic ulcerative colitis. These symptoms may be present without definite clinical evidences of the neuritis or cardiac symptom of beriberi. In our series of beriberi patients the improvement in the appetite, in the gastro-intestinal symptoms and in the general well-being of the patient, probably as a result of the clearing up of the functional disturbances of the alimentary tract, were astounding. In some few patients in whom it was inferred that latent beriberi was present a similar improvement following the therapeutic test of giving vitamin B, indicated that in some instances the inference was correct, in other cases incorrect.

Vitamin B is a complex substance with at least a half dozen products entering into its make-up, but only one of which, B_1, has been isolated, identified in pure form and crystallized. Because of its complexities vitamin B_2 (G), a flavine compound, and P-P, have been incorporated in the group. This is not the time nor place to enter into a discussion as to where to list the substance (or substances) that will prevent pellagra; arbitrarily it will be done here.

The gastro-intestintal expressions of pellagra need no recounting. From the sore mouth to the inflamed rectum the disease spreads a goodly part of the harm on the mucous membranes of the alimentary tract. This involvement is, to our way of thinking, the most important of the three great expressions of the condition because only when the symptoms arising from the mouth and gut are controlled do the dermic and mental symptoms improve. That pellagra is a deficiency disease is generally acknowledged, but there must be other factors that play a part in the production of the symptoms because pellagra alone of these diseases does not always improve as do the other deficiency diseases when the known or hypothetical substances responsible for the condition are given the pellagrin.

Subclinical pellagra is of importance but pellagra without eruption is difficult, if not impossible, to diagnose and consequently its recognition is relatively rare. In the prodromal stage anorexia, lassitude and vertigo are frequent symptoms.

Vitamin C.—The lack of this vitamin, cevitamic acid, from the diet is known to produce among other symptoms gingivitis, pyorrhea, bad teeth, anorexia and bloody diarrhea. That its inadequacy may bring about changes in the lower alimentary tract seems possible from some observations made in a recent patient in the Charity Hospital who was admitted on account of a horrible stomatitis and a severe proctitis. This woman was found to have practically an absence of cevitamic acid from her blood and urine. On a vitamin poor diet supplemented by large amounts of tomato and orange juice her mouth condition improved with astounding rapidity and her proctitis sluggishly but definitely.

Vitamins D and E.—These play probably no part in the development of gastro-intestinal symptoms.

CHRONIC DIETARY DEFICIENCIES

It would seem the part of wisdom to drop the term subclinical or latent as applied to borderline deficiencies. It is true that subclinical or latent scurvy, or beriberi, may exist, but, as said before, a diet inadequate in one vitamin is likely to be lacking in other vitamins. Even if adequate for ordinary contingencies, for the pregnant woman, the lactating mother, the growing child, the hyperthyroid individual or the patient with a febrile or wasting disease, the diet may not meet the vitamin requirement. It will not be just one vitamin, but probably all the vitamins that they need. These patients are suffering from a chronic, possibly subacute, dietary deficiency. This term is comprehensive and understandable. It implies a

"malnutritive state characterized by a group of nonspecific symptoms and signs arising from a deficiency in the diet of any or, theoretically, all the essential food factors" (Musser and Sodeman).

These symptoms are dependent upon failure of the organism to obtain an optimal intake or utilization of minerals and vitamins. This failure may result from a variety of causes which may be dependent upon factors outside the gastro-intestinal tract or which may be due to disturbances of function or form in the alimentary passages. Thus it may merely be a problem of an inadequate intake of food possibly motivated by anorexia. It may be through loss of food, too rapid passage of food through the tract as result of diarrhea, vomiting or external fistula or from failure of absorption from a deficiency of bile resulting from liver disease. It may be that the deficiency state may be dependent upon a too rapid consumption of food substances as in hyperthyroidism. The lack of the

important factors in the intestinal tract may in turn be the result of decreased production of certain essential digestive juices or it may be that there is inadequate intestinal absorption or even inability of the liver to store.

From this discussion it is obvious that gastro-intestinal disturbances may be capable of producing a chronic dietary deficiency syndrome and on the other hand the deficiency itself may result in gastro-intestinal symptoms. These symptoms are many and varied and while in many instances they may be associated with expressions not related to the gastro-intestinal tract almost invariably gastro-intestinal symptoms do arise and almost always the symptoms develop sooner or later. Anorexia is very common in nearly all the avitaminoses. Belching of gas, gastric discomfort, alteration in bowel movements and so on, are frequently the result of not one vitamin deficiency, but of a minimal intake or utilization of a group of vitamins. That these thin, anemic, sometimes neurotic patients without any physical signs of organic disease may be suffering from a chronic dietary deficiency may be substantiated by feeding to them a diet adequate in energy consumption, supplemented by optimal intake of vitamins, or at the start at least it may be well to supplement the diet with vitamin concentrates. Steinberg reports the relief of gastro-intestinal symptoms and constipation in nine out of ten patients suffering from various forms of arthritis by the administration of yeast, an excellent indication of how vitamin B complex may be assisted in restoring the bowel tone to normal when there is no gross expression of vitamin B complex deficiency.

It is extremely common to see in our clinic clientele patients who suffer from chronic dietary deficiency. This condition is frequent, but on the other hand the outstanding syndromes associated with deficiency of one or another vitamin are uncommon. Pellagra is observed from time to time; sprue likewise; beriberi rarely, and scurvy infrequently. On the other hand, pernicious anemia which, when all is said and done, represents a deficiency disorder, is very common. Of all these conditions the state of malnutrition associated with a variety of symptoms, attributable to chronic dietary faults, is by far the most frequent.

CONDITIONED DEFICIENCIES

By a conditioned deficiency is implied a deficiency which is conditioned upon some pre-existing disorder within the body. Strictly speaking, this term should be limited to pernicious anemia and possibly sprue. In pernicious anemia there is an absence of something from the stomach, the intrinsic factor, which in spite of the ingestion of large quantities of the other necessary factor, the extrinsic, there still exists a deficiency of a substance which is called the anti-anemic factor elaborated by the interreaction of the two and stored in the liver. Sprue is probably in the same category as pernicious anemia. The gastro-intestinal symptoms of these two conditions are so well known that they hardly need any recapitulation. There is one thing I do want to point out, however, in conjunction with these two diseases and that is the frequency with which tongue changes are observed here and in the avitaminoses. They are common, to be looked for, and anticipated.

It is quite possible to extend the so-called conditioned deficiencies to include many of the diseases to which man is heir. Strictly speaking, a person who has a severe diarrhea and whose vitamins are passing from the mouth to the rectum too rapidly to be utilized has a conditioned deficiency. A man whose liver cannot act upon these substances is in the same condition. A host of examples might be predicated. The Vinson-Plummer syndrome might properly belong in this category. The glossitis and anemia and the relief by injections of liver of the dysphagia and anemia certainly identifies it with some dietary deficiency. However, the anemia is usually microcytic in type and the associated esophageal lesions are uncommon in pernicious anemia and sprue.

SUMMARY

The avitaminoses are very frequently associated with gastro-intestinal symptoms which may dominate the whole clinical picture. Gastro-intestinal disturbances, on the other hand, may result in deficiency expressions. The clinician, in the management of patients suffering from rather vague and indeterminate symptoms, notably those which may be labeled dyspepsia, or dyspepsia symptoms, should bear in mind that they may result from a diet which on superficial examination seems to be adequate but which in actuality is substandard.

DISCUSSION (*Abstract*)

Dr. James S. McLester, Birmingham, Ala.—Dr. Musser refers to the difference in chemical structure of the several vitamins. One of them is a nitrogenous base; others are hydrocarbons and others are sterols. Because of these differences, it is difficult to justify our inclusion of these substances in a single group. Neither is there a

physiologic basis for a common grouping, for there is no kinship in the physiologic activities of the several vitamins. We continue, however, to include these substances under the single generic term, vitamin, in part because they are distinct from other food factors in the minuteness of the amounts required, but chiefly because they have in common a regulatory influence over nutritive processes. Reasoning from this basis, however, there can be found little justification for separating vitamins from hormones. In truth, the two have much in common and one could find good warrant for grouping them together. The chief difference between the two (which does not hold good in all instances) lies in the fact that while hormones are formed within the body by the endocrine organs, vitamins are derived from the outside world through the medium of food. For the sake of convenience I presume we shall always group the latter.

The most significant feature of recent vitamin research work, to my mind, and one which has a direct bearing upon the observations of Dr. Musser and Dr. Sodeman is the discovery that the words "adequate" and "optimum," as applied in nutrition, are by no means synonymous. Animal experiment has repeatedly shown that the addition of a given vitamin in increasing amounts to an apparently adequate diet will be accompanied by improvements in the animal's vigor and well-being which parallel these conditions in a remarkable manner until an amount of vitamin is given which is several times that sufficient to prevent actual deficiency disease. Sherman and MacLeod have shown, for example, that the optimum intake of vitamin A for rats is several times that necessary to prevent evidences of deficiency disease. Similar results were obtained by Batchelor, who found that the greatest improvement occurred in her experimental animals when they were receiving four times the amount of vitamin A necessary to prevent actual disease, and it was significant that the greatest improvements were observed in the second generation. For vitamin B_1, Knot found that rapidly growing children maintained the maximum amount of this factor when permitted an intake which was six or seven times that necessary to prevent beriberi. Regarding vitamin C, while 400 or 500 units represents the minimum protective dose, Everson and Daniels showed for boys of school age that 2,400 units, practically five times the minimum dose, represented the ideal intake. For vitamin G, Sherman and Ellis found that the improvement in the health of their animals ascended in a curve parallel to that of the increasing vitamin intake until the animal was receiving an amount of this vitamin four times that necessary to prevent specific signs of deficiency.

The problem which concerns you and me most deeply is not the recognition of outspoken deficiency disease, important as it is, but rather of these borderline states which debilitate the patient without making him actually sick. Is it not possible that a great deal of the vague ill health seen today, especially that referable to the digestive tract, is produced by marginal diets in which the quotas of minerals and vitamins are grossly suboptimal? If the optimum intake of a given vitamin is something like four or five times that necessary to prevent outspoken deficiency disease, is it not possible that a diet poor, though not actually deficient, in these factors, when coupled with some other debilitating influence, will result in a functional breakdown? My own experience would lead me to believe that this is true, and conversely that a more abundant consumption of the protective foods would result in a lessening of ill health and in the development of a more vigorous people.

Dr. M. Bodansky, Galveston, Tex.—Only a few years ago the vitamins were to most of us just so many letters of the alphabet. Without a clear knowledge of the experimental criteria used in their identification, it was difficult to overcome a skeptical attitude toward the subject as a whole and certainly as to its clinical relevance. All that has changed, for now practically all the known vitamins have been isolated, crystallized, analyzed; their chemical constitutions have been determined and finally most of them have been synthetized or produced in the laboratory from closely related substances. Side by side with these amazing developments has come a clearer comprehension of the clinical aspects of vitamin deficiency and particularly of the manifestations of borderline avitaminoses.

Certain major developments may be touched on in the briefest possible form. First is the recognition of the so-called vitamin complexes. The properties once ascribed to vitamin B, we now know to be due to a group of distinct, albeit often coexisting substances. One of these is the antineuritic factor, vitamin B_1, which is a pyrimidine-thiazole compound. Another is vitamin B_2, or G. It has been identified as riboflavin. Recent work indicates that the anti-pellagra vitamin may be nicotinic acid, or its amide. Vitamin C has been identified as ascorbic (cevitamic) acid. From the work of Szent-Györgyi, recent recipient of the Nobel Prize in medicine, it seems that the manifestations of scurvy are not due solely to a lack of vitamin C, but that there is the additional deficiency of two flavone pigments, the glucoside hesperidine and its ally, eridictyol glucoside. These pigments occur in oranges, lemons, Hungarian red peppers and in other materials which also happen to be rich sources of ascorbic acid. According to Szent-Györgyi, they are concerned with maintaining the integrity of the walls of blood vessels. Incidentally, these flavone pigments have been known to chemists for about half a century.

Among other noteworthy developments have been the recognition of the multiple nature of certain vitamins (D, E, and possibly A) and of the existence of various provitamins (A, and in some respects D).

Of even greater importance is that we are just beginning to realize that the real significance of the vitamins lies perhaps in the fact that they are intimately tied up with fundamental chemical reactions within the cells. Vitamin B_1, for example, is involved in carbohydrate metabolism. To be more specific, the diphosphate of this vitamin is a component of an enzyme system in brain, heart, and possibly other tissues that is essential for the oxidation of pyruvic acid. In vitamin B_1 deficiency, pyruvic acid fails to be oxidized and therefore accumulates. This in turn inhibits the oxidation of lactic acid. Vitamin B_2 (or G) is the prosthetic group of the so-called "yellow enzyme" of Warburg. Even before the possible identity of nicotinic acid amide and the anti-pellagra factor was suspected, this substance was recognized as the nucleus of a readily reversible oxidation-reduction system present in red cells and elsewhere. Vita-

min C we know to be of importance as an oxygen transporter in biological oxidations.

In other words, at least certain of the fundamental cellular reactions depend on the presence of vitamins. Vitamin deficiencies strike at the roots and cause such generalized disorganization of cellular activity and energy transformations that we obtain what appears to be, superficially, a multiplicity of unrelated clinical phenomena. There is, of course, the other angle, that clinically we are confronted not with complete and single factor deficiencies, but with incomplete and multiple factor deficiencies. By way of conclusion a word of reassurance is perhaps in order. It may seem that in spite of recent achievements, the vitamin problem has become very intricate and confusing. This is not so. In reality our knowledge has become much more definite in the last few years, and moreover, the rapid succession of recent discoveries is a promise that we may soon attain a more completely integrated conception of the fundamental properties of the vitamins and of the real significance of the avitaminoses in disorders of nutrition and metabolism.

THE ANTIPELLAGRIC EFFECT OF CERTAIN PYRIDINE COMPOUNDS*

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Following the report by Elvehjem, Strong, Madden and Woolley[1] that nicotinic acid (pyridine-3-carboxylic acid) and nicotinic acid amide were curative for canine blacktongue, a number of investigators studied the effect of nicotinic acid in human pellagra. Independently, various investigators[2 3 4 5 6 7] have found that nicotinic acid is beneficial in the treatment of pellagra in human beings. In addition, it has been shown[8] that nicotinic acid amide, sodium nicotinate and the diethyl amide of nicotinic acid ("coramine") are also antipellagric. These observations have stimulated search for additional compounds.

Preparations of picolinic acid (pyridine-2-carboxylic acid), alpha picoline (2-methyl pyridine), beta picoline (3-methyl pyridine), trigonelline (methyl betaine of nicotinic acid), beta aminopyridine, 2-6 dimethyl pyridine-3:5-carboxylic acid, and dinicotinic acid (pyridine-3:5-dicarboxylic acid) have been studied and some results are reported in the present communication. Since no report upon the effect of these substances upon human beings could be found, preliminary studies were made to determine a safe range of dosage. Some of the tests for toxic properties were conducted upon ourselves, associates and normal people before administering the substance orally to pellagrins.

(1) Picolinic acid, prepared by Mrs. S. P. Vilter, was not administered to patients because preliminary study demonstrated that it was somewhat toxic.

(2) Over a period of 24 hours a total of 100 mg. of alpha picoline was given to a single pellagrin. No beneficial effect was observed from this dosage, and it did not seem wise to administer more because of its apparent toxicity.

(3) Beta picoline, prepared by Dr. C. E. Bills, was administered to one severe pellagrin in relapse. A total of 500 milligrams a day, in divided doses, was given for four days. Some improvement occurred following this therapy, but lack of material prevented further observations.

(4) Trigonelline, prepared through the courtesy of Dr. R. T. Major and Dr. Hans Molitor, was given in divided doses to three pellagrins in relapse. No improvement occurred despite the fact that 1,500 mg. of the substance was given each patient during this period. Each patient improved spectacularly in 24 to 48 hours following the administration of the same amount of nicotinic acid by mouth. These observations indicate that trigonelline is not antipellagric. They are consistent with the results of Woolley, Strong and Madden,[9] and of SubbaRow and Dann,[10] which showed that canine blacktongue was not remitted by trigonelline.

(5) Recently SubbaRow has isolated beta aminopyridine from liver extract and he, Dann and Meilman[11] have reported that it is effective in treating canine blacktongue. We administered up to 700 mg. daily in divided doses to three mild pellagrins. Some questionable results were apparent over short periods of time, but the material we used was toxic and its administration was discontinued. Beta aminopyridine is unstable, and studies are being made to determine whether or not the toxicity may be due to a decomposition product or to impurities. Our

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*Received for publication July 8, 1938.

studies do not support those of SubbaRow, Dann and Meilman.

(6) Dr. Robert Shelton prepared the 2-6 dimethyl pyridine-3:5-carboxylic acid that we administered to eight pellagrins in relapse. Definite improvement could be noted within a few hours after administration of 400 to 1,000 mg. in doses of 100 mg. each. Under control conditions patients have been allowed to relapse and were again treated with the substance with similar results.

(7) As a result of a recent communication from Dr. Y. SubbaRow, stating that he had found dinicotinic acid in liver extract, this substance was administered to six pellagrins in relapse, in amounts of from 400 to 1,000 milligrams daily, in divided doses, and was followed by improvement in a few hours. Following withdrawal of this substance, the manifestations of pellagra reappeared. A similar beneficial response followed the second administration of dinicotinic acid.

The isolation of beta aminopyridine and dinicotinic acid from liver extract, by SubbaRow, is of great importance. The studies presented in this communication suggest that a number of pyridine derivatives may have a beneficial effect upon pellagrins in relapse. Since under the conditions of this study the effect could be temporary and partial, the determinations of this point are still in progress. This series of cases is too small, and too little is known of the physiologic action of these intermediate pyridine compounds to warrant suggesting them either as safe or effective agents in the treatment of human pellagra. Also, they have been given over an insufficient period of time, whereas nicotinic acid has been investigated sufficiently to warrant no hesitancy in recommending its use as a therapeutic agent, and in stating that we have sometimes found it life-saving.

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GASTRO-INTESTINAL DISORDERS SIMULATING HEART DISEASE*

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The atypical case of coronary thrombosis which at its onset presents symptoms indistinguishable from those of a perforating peptic ulcer or an acute surgical condition of the gallbladder, has served to emphasize the close relationship which exists between the heart and the gastro-intestinal tract. We have become familiar with the fact that heart disease may at times give rise to acute gastro-intestinal symptoms of extreme severity.

It is not so well known, I believe, that certain gastro-intestinal disturbances may give rise to conspicuous cardiac symptoms, such as syncope, collapse, shock, a weak and thready pulse, arrhythmia, and substernal pain. That these striking cardiac symptoms may be produced in a patient without heart disease should be borne in mind, particularly now when the mortality statistics and the newspaper headlines have focused the attention of both physician and patient upon the heart as a fruitful source of disability and death.

The serious nature of the heart symptoms arising in some gastro-intestinal disorders and the manner in which they may simulate grave cardiac crises became evident to me during the study of the following case:

A white woman, 40 years of age, occasionally developed acute symptoms of nausea, gastric distention, abdominal flatulency, marked eructation of gas, and a weak radial pulse, followed by paroxsymal auricular fibrillation, syncope, and collapse. The patient would become toxic and rapidly take on the appearance of extreme dehydration. The attacks usually occurred during the early morning hours and were brought on by the patient's having eaten food at irregular hours during

*Read in Section on Medicine, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

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the previous day, or while she was nervously fatigued or emotionally disturbed. Induced vomiting resulted in the expulsion of fluid in excess of the amount ingested. The vomitus also contained large amounts of undigested food. Frequently food that had been consumed at midday was found in the vomitus of the early morning hours. The expulsion of the gastric contents and the evacuation of the bowels were followed by the gradual subsidence of the cardiac symptoms, with the exception of the auricular fibrillation. The arrhythmia was relieved only by the administration of large doses of quinidine sulphate. The patient had no attacks of paroxysmal auricular fibrillation except those which had their onset during the gastro-intestinal disturbances.

The relationship which the attacks bore to food, together with the fact that an enormous quantity of fluid was vomited before relief was obtained, suggested a gastric origin of the attacks. Over a period of years, several gastro-enterologists examined the patient and repeated roentgenological studies were made. No evidence was found at any time to indicate that the attacks were secondary to disease of the gallbladder or appendix. A diagnosis of gastric neurosis was made by one gastro-enterologist. The others were of the opinion that the gastro-intestinal symptoms were secondary to heart disease. Teleoroentgenograms taken on numerous occasions have shown the heart to be normal in size and contour. Electrocardiograms have shown no deviation from the normal except during attacks of paroxysmal auricular fibrillation. The heart has at no time been affected by strenuous exercise, including mountain climbing at an altitude of over 6,000 feet. A number of cardiologists who have examined the patient have stated that heart disease was not present. The attacks have continued to recur for several years. At times they have been frequent and severe. Recently, roentgenological studies have revealed a small duodenal diverticulum. A fluoroscopic examination following a barium meal showed the presence of pylorospasm and colonic spasm. Numerous highly ballooned areas of the colon were interspersed with areas of marked contracture. A diagnosis was made of pylorospasm induced by irritation or stimulation from the duodenal diverticulum. With the proper management of diet and the administration of tincture of belladonna leaves before meals and a mild sedative, the attacks occur less frequently. It is interesting to note that as long as the patient refrains from emotional disturbances and does not become nervously fatigued, there are no gastro-intestinal or cardiac symptoms.

In the case just cited pain was not present during the attacks. In another case, however, substernal pain was the predominant symptom and was associated with collapse, pallor, and a weak radial pulse. The symptoms in this instance closely simulated those of coronary thrombosis.

A woman, aged 69 years, three years prior to my examination of her, had had an attack of severe substernal pain with syncope and collapse, a blanched, clammy skin, and a weak radial pulse. The administration of morphine sulphate did not relieve the pain, but it did induce vomiting. Following the expulsion of the gastric contents, the patient was relieved of the substernal pain and the accompanying symptoms. The physician who was in attendance made a diagnosis of acute coronary thrombosis and put the patient at complete rest in bed for a prolonged period. During the subsequent three years she had several similar attacks. Following each attack she spent a number of weeks in bed. In the intervals between attacks her activities were greatly restricted. She became nervous and depressed and developed an anxiety neurosis. A carefully taken history, at the time she came under my observation, elicited the fact that the initial attack of substernal pain had followed the ingestion of a hearty meal at a time when the patient had lost a large fortune in the financial crash and had been left almost penniless. The subsequent attacks had invariably followed an indiscretion in diet or the ingestion of food when she was fatigued or nervous. The pain was described as burning or cramplike. It did not radiate. Aside from the pain, the two most predominant features of the attacks were the enormous quantity of fluid which was vomited and the relief from symptoms which vomiting afforded. Physical examination and laboratory studies showed the patient to have a moderate degree of generalized arteriosclerosis and probably coronary sclerosis as demonstrated by the electrocardiogram which showed an inverted T_1 and a diphasic T_4, Lead IV being taken with the exploring electrode on the anterior chest wall and the indifferent electrode on the posterior chest wall. It is in such a patient that acute gastro-intestinal symptoms rightly arouse our suspicions of a possible coronary occlusion. However, in this case the attacks occurred on repeated occasions and were invariably related to food. The symptoms were relieved by the expulsion of the gastric contents. In this case, as in the previous one, an enormous amount of fluid was vomited, suggesting gastric hypersecretion and the closure of the pyloric orifice. The patient, after repeated attacks, presented no signs or symptoms of cardiac incompetency.

A search of the literature for analogous cases was disappointing. Descriptions of the condition give little information. Riegel,[1] in 1896, expressed the opinion that pylorospasm was of frequent occurrence; that it gave rise to symptoms of pain, increased peristalsis, and vomiting; and that it was seen as a secondary manifestation in hyperchlorhydria, in acute and chronic gastrorrhea, in round peptic ulcer, and in irritation of the stomach by indigestible food. Friedenwald[2] has stated that pneumatosis is at times produced by a simultaneous cardio- and pylorospasm, which is marked by extreme distention of the stomach and symptoms and signs of an alarming nature, such as dyspnea, precordial discomfort and pain, a rapid irregular pulse, and cyanosis. Meakens[3] has noted that the pyloric sphincter seems to permit the stomach to empty more readily in achlorhydria than when pronounced hyperacidity is present and that pylorospasm is sometimes observed in the severe forms of hyperacidity associated with peptic ulcer and certain other reflex causes. Balfour[4] has stated that the presence of small ulcers of the stomach or duodenum, or irritating lesions almost anywhere in the intestine or abdomen, will influence the action of the pylorus. He[5] has called

attention to three types of pylorospasm: the irritative type, secondary to an organic lesion of the stomach or duodenum; the reflex type, secondary to lesions or dysfunction of the appendix, gallbladder, cecum, pancreas, colon, or genito-urinary organs; and the functional type, caused by psychoneurosis, diseases of the central nervous system, and toxic states due to poisoning. Pylorospasm in the absence of a demonstrable intrinsic lesion is frequently responsible, according to Balfour, for the painful clinical manifestations which arise from a disturbance of the gastric function. Alvarez[6] has demonstrated experimentally that anything which stimulates the upper bowel will delay the emptying of the stomach. He[7] has pointed out that the muscle fibers surrounding the pyloric orifice have a lower threshold for stimuli and a shorter latent period than has the gastric musculature and that an irritating lesion situated near the pylorus may cause a spasmodic contraction of the orifice.

A second gastro-intestinal disorder which not infrequently simulates an acute heart attack is cardiospasm. In the early stages of this condition, before dysphagia or regurgitation occurs, attacks of pain, high in the epigastrium or in the lower substernal region, may be the only symptom. Vinson,[8] who reported a series of 500 cases of cardiospasm examined at the Mayo Clinic, noted that epigastric pain was present in 52 per cent of the cases. The pain radiated substernally, into the back, or into the neck. With many of the patients in his series acute attacks of severe pain occurred as the chief symptom and antedated the appearance of dysphagia by months or years. Until dysphagia appeared, the diagnosis of an esophageal lesion could not be made. Vinson called attention to the fact that the pain of cardiospasm at times simulated that of angina pectoris. Freeman[9] made a similar observation, and pointed out that diagnosis was sometimes confused because the pain radiated through to the back and because in some cases it occurred several hours after the intake of food. Hara,[10] in an analysis of 44 cases of cardiospasm, noted that attacks of substernal pain simulating angina pectoris were present in ten of the cases (22 per cent). Moersch and Camp[11] reported that in a series of eight cases of diffuse spasm of the lower portion of the esophagus, substernal pain was a prominent symptom. When the pain was severe it radiated into the back, into the neck, or into the shoulders. In two of the eight cases the character and radiation of the pain were such that a previous diagnosis of angina pectoris had been made.

Because cardiospasm in its early stages may simulate attacks of angina pectoris, not a few patients suffering from angina have been treated for cardiospasm. Two such patients have recently come under my observation. Both had attacks of substernal pain induced by exertion following the ingestion of a hearty meal. One was treated for cardiospasm for a year and a half before the anginal nature of the attacks was determined. The second patient was treated for cardiospasm for two years with frequent dilatation by bougies.

It has been my experience that much of the confusion in the diagnosis of angina pectoris comes from an acceptance of the pseudo-anginas and the angina of this and that. By implication they come to be accepted as forms or types of angina pectoris. To speak of "true angina" and "false angina" is equally confusing. There is angina pectoris and there is pain which simulates that of angina pectoris. My clinical observations have convinced me of the wisdom of confining the use of the term angina pectoris to those attacks of pain which conform to the criteria inherent in the classical Heberden syndrome. That is, the attacks are precipitated by a fairly constant amount of exertion, excitement, or the ingestion of a hearty meal. The pain centers in the substernal region; it may or may not radiate; and it is of a burning, constricting, or crunching character. The attack is paroxysmal with a gradual rise in the intensity of the pain and a gradual subsidence. The duration of an attack varies from a few seconds to fifteen minutes, except in anginal failure when it may last longer. If the pain is severe and prolonged there will be some degree of pallor and apprehension. A patient suffering from an attack of angina comes to an abrupt standstill and remains motionless until the pain subsides. There are no "hangover" symptoms.

Certain of these criteria will be especially useful in the differential diagnosis of angina pectoris and cardiospasm. For instance, when substernal pain bears no constant relation to a given amount of exertion, excitement, or overeating it is probably not angina pectoris. It is only in anginal failure that an attack of angina pectoris occurs while the patient is at rest. Other useful clues to the correct diagnosis of the two conditions are the duration of the attack, the intensity of the pain at its onset, the characteristic attitude of the patient during an attack, and his freedom from related symptoms prior and subsequent to an attack.

Mild cardiac symptoms are at times produced by the accumulation of gas in the stomach or intestines, due to dietary errors, overeating, or nervous influences. Palpitation, dyspnea, pallor, a sensation of oppression in the epigastrium, or epigastric pain radiating into the chest, back, or shoulders may accompany gaseous distention. Whether the cardiac symptoms are produced mechanically from the subdiaphragmatic pressure on the heart, or whether they have a vagal origin is a disputed point.

Perhaps the most obscure source of confusion between abdominal and cardiac conditions lies in those indefinite and vague conditions which are generally referred to as gastro-intestinal upsets and which are brought on by indiscretions in diet. They may at times simulate an acute attack of coronary thrombosis, as in the following case. A professional man in his early seventies had a sudden attack of intense, continuous epigastric pain, radiating into the chest and shoulders. When I saw him he was in extreme shock; his skin was cold, clammy, and ashen grey; the mucous membranes of the lips were cyanotic; the radial pulse was weak and thready; and the blood pressure had dropped. He was moderately dyspneic. The abdomen was greatly distended and tympanitic. He appeared to be suffering from an acute attack of coronary thrombosis. However, the patient's wife, in reply to questions, stated that during her absence early in the evening her husband, following a hearty midday meal, had raided the icebox. He had eaten cold indigestible food and chili con carne. Vomiting was induced, and large amounts of undigested, fermented food appeared in the vomitus. After the stomach had been emptied of its contents the symptoms disappeared.

Why a gastro-intestinal upset will cause predominantly cardiovascular symptoms in one case and not in another, we do not know. The presence of arteriosclerotic or hypertensive heart disease, a cardiac neurosis, or a labile nervous system may be the determining factor. In a comprehensive article, Weiss and Wilkins[12] have pointed out that syncope, collapse, and shock are transient forms of circulatory failure and as such produce cardiovascular symptoms. Among several causes of collapse and shock, they mention chemical agents, psychic and nervous factors, and dehydration. In my experience, when gastro-intestinal disorders have given rise to striking cardiac symptoms and signs, the patient has been in collapse or shock. This may have been produced by the dehydration which so often accompanies a gastro-intestinal disturbance, especially pylorospasm. According to Weiss,

"It has been estimated that normally between 7,500 and 10,000 cubic centimeters of fluid are secreted into the intestinal canal within twenty-four hours. Whereas in health the greater part of this fluid is reabsorbed, in pathological conditions, particularly those associated with vomiting and diarrhea, most of it, together with its organic and inorganic constituents, may be lost. Unless corrected, such a fluid and salt loss rapidly leads to a reduction of the blood volume with hemo-concentration and hence to collapse and shock."

This discussion has been confined to those more or less obscure forms of gastro-intestinal disorders which, I believe, present an especially perplexing diagnostic problem to cardiologist, gastro-enterologist, internist, and surgeon. A considerable number of patients without evidence of heart disease but with well-established cardiac neuroses have come under my observation with a diagnosis of heart disease. It is not always remembered that cardiac symptoms overshadow everything else in the mind of the average patient, and that he will think unimportant many revealing details which only a carefully taken history will disclose. It is sometimes necessary to question the patient on more than one occasion in order to bring out all of the facts which may have diagnostic importance.

A diagnosis of heart disease usually means a curtailment of the patient's activity, it places the patient and his family under a considerable degree of apprehension, and it not infrequently serves to establish a cardiac neurosis. I do not wish to throw the emphasis the wrong way. When cardiac symptoms are present, a careful search should be made for an underlying cardiac condition. It would be regrettable to add one more case of coronary thrombosis to the many now on record which have been treated as abdominal conditions because atypical symptoms were present. However, it might be well to bear in mind a statement recently made by James Herrick,[13] whose brilliant clinical studies made coronary thrombosis a recognizable clinical entity. He said:

"I have personally seen twenty-eight different conditions wrongly regarded as acute coronary occlusion."

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DISCUSSION (*Abstract*)

Dr. C. W. Dowden, Louisville, Ky.—For an understanding of upper abdominal conditions that simulate heart disease, one must first appreciate the fact that the phrenic nerve, which arises chiefly from the fourth cervical segment of the spinal cord and to a less extent the third and fifth segments, passes down from the neck through the thorax to the diaphragm, where it ends by supplying motor fibers to the muscle of the diaphragm and sensory fibers to the peritoneum lining its under surface, and the pleura lining its upper surface, as well as fibers to the pericardium. By keeping this fact in mind, it is not difficult to understand how a perforating gastric or duodenal ulcer can cause symptoms simulating heart disease by the acid gastric contents irritating these terminal fibers of the phrenic nerve. Possibly, also, other gastric conditions may act similarly.

In 1929, I read a paper before this Association on the myocardial masquerades of gallbladder disease In 28 of 100 cases there was sufficient evidence from operative procedure or visualization of the gallbladder to leave little or no doubt as to the presence of gallstones. The 28 cases were further reduced to 12, who presented themselves without symptoms suggestive of gallbladder or gastro-intestinal disease. The 12 cases were then further reduced to 3, to represent those patients who applied for investigation of symptoms referable to the cardiovascular apparatus and in whom gallstones were found in the course of the routine diagnostic study. It is my belief that the association of duodenal ulcer and gallbladder disease is not infrequent and that gastric symptoms frequently predominate in cholecystic disease. When there is irritation of the biliary tract the stimulus passes to the area proximal to the point of irritation which is occupied by the stomach and pylorus musculature, and spasm of these structures occurs. Frequently, when cardiospasm is present any chronic biliary tract disease may be suspected. Schrager and Ivy looked upon the respiratory embarrassment with upper abdominal pain complex as a valuable diagnostic aid. By a simple apparatus they were able, experimentally, to distend the normal gallbladder and cystic duct, measuring the amount of pressure with the mercury manometer. Their experiments were made after sectioning the vagi and the splanchnics. On distention they looked for such reflex manifestations as distress, inhibition of respiration, and vomiting. They had been able to determine clinically that the degree of respiratory difficulty depended upon the degree of distention of the gallbladder wall or mechanical obstruction of the cystic duct. In a limited number of these cases the pains, instead of radiating to the back and shoulders, were referred to the midsternum and suggested angina pectoris.

Certainly, Dr. Lyon has proven that in his cases the symptoms which were directly referable to the gastrointestinal tract simulated heart disease and were relieved by proper remedies. It is in no sense disparaging, however, to wonder how much the biliary tract through actual disease or through functional distention may have contributed to the symptoms and signs which were predominantly referable to the epigastrium and substernal area.

Dr. J. Russell Verbrycke, Jr., Washington, D. C.—Dr. Lyon has brought up a difficult problem. I remember a patient who had to be operated upon for a chronic perforation of a gastric ulcer, but whose heart was fibrillating so badly (not extra systoles) that it was doubtful whether he could live through the operation. The heart never skipped a beat after the anesthetic was started and gave no sign of trouble in the months following operation.

One of the most difficult problems is to distinguish between gallstone attacks and angina pectoris or to determine the correct procedure when one knows from cholecystograms that gallstones are present, but the symptoms are anginoid in character. Several years ago Lord Moynihan stated that he had relieved a number of such patients, referred to him by Sir James McKenzie, of all heart symptoms by removal of the gallbladder.

On the other hand, the number of patients coming to the gastro-enterologist who really have heart trouble is even greater. I believe that I see nearly as many cases of angina as does the heart specialist. It is hard to persuade these people that their trouble is not digestive since their symptoms often appear on walking after eating, and belching frequently seems to afford relief.

Another confusing picture is made by the symptoms of anginoid attacks in some cases of cardiospasm. In this connection I wish to point out that there is a factor in common between the two conditions since in a series of around 250 cases of cardiospasm I have collected no less than 30 instances of coincident angina or aortitis. What this factor is I am unable to state, as we are still in the dark as to the cause of cardiospasm.

Dr. S. C. Davis, Tucson, Ariz.—Since very little has been said about treatment of this condition, I wish to call attention to relief obtained in doing a temporary phrenic interruption. If the patient is relieved, repeat or do a permanent interruption. The results have been very gratifying, and relief is what the patient is looking for in pseudoangina.

Dr. Lyon (closing).—Dr. Dowden has raised the question of the possible presence of gallbladder disease in the cases being reported. In the first case, the possibility that gallbladder disease was present was definitely excluded on several occasions when roentgenologic studies were made by the dye method and biliary drainage was induced to permit a general examination and a bacteriological study of the gallbladder contents. On

each of the several occasions when these tests were made the findings were normal, and the consultants who had requested that the tests be made were satisfied that gallbladder disease was not present. The patient in this case was closely observed clinically over a period of several years, and the attacks have always been initiated in precisely the same manner which I described in reporting the case. In none of the other cases was there evidence that gallbladder disease was present.

PRURITUS ANI*

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Much time and energy have been spent in attempts to determine the etiology of pruritus ani and equal consideration and study have been given to measures which might offer some degree of certainty for its cure. The literature on the subject is voluminous and its perusal will show that there have been, and still exist, many varied opinions in regard to the disease. Our impression is that there is little agreement even among the closest observers as to the cause of perianal pruritus and the most satisfactory means to employ for its relief. Some of the latest writers on the subject still mention many anorectal diseases as causing pruritus of the anal region. We have long ago discarded this idea for the reason that removal of the pathologic conditions mentioned had little or no influence on a coexistent pruritus. We have reference to that intense, persistent and intolerable itching, usually worse at night, and not to an irritation or an occasional itching which of course may result from a discharging sinus or fissure. We consider true pruritus ani a distinct entity due to an infection of the skin of the parts immediately involved. This probably is the view taken by most of those who have given thought to the subject. There has been much controversy, however, as to the causative infectious organism. When the location of the disease is considered, is there any wonder that various pathogenic bacteria may be found inhabiting the parts? There is little doubt that certain strains of streptococci, staphylococci, colon bacilli and even fungi or yeast cells may be obtained from the lesions of the pruritic area. Who can with any degree of certainty say which organism is the primary causative agent? With this fact in mind we are reluctant to make any dogmatic statements, for they could not be substantiated; but rather it is our intention to give our own impressions of the disease for your consideration. We shall outline in some detail our management of these cases and give some reasons for our conclusions.

Castellani as early as 1914 wrote an article calling attention to pruritus ani of mycotic origin. This paper, we believe, has been largely overlooked by proctologists. It certainly did not attract the consideration it seems to have deserved. He has repeatedly demonstrated the presence of fungi in pruritus ani and vulvae. The most common fungi found are those of the genus epidermophyton, the same fungus which causes pruritus interdigitalis pedum and also tinea cruris. Castellani says:

"The condition is as a rule a form of latent epidermophytosis of the ano-perineal region without the usual objective symptoms of an ordinary active epidermophytosis being present."

Other facts which strengthen our belief in the mycotic etiology of pruritus ani follow:

(1) The most prominent symptom of practically all fungal diseases is itching.

(2) The lesions frequently resemble those occurring elsewhere which are known to be of fungous origin.

(3) The perianal skin certainly presents suitable conditions for fungal growth.

(4) Ordinary antiseptics do not greatly improve the condition, whereas potent fungicides do. Following this principle, treatment has been more successful than with any other.

We consider about 90 per cent of our cases to be of mycotic origin and we believe the large majority of these can be entirely cured by local applications. Unfortunately at the present time we have no universally acceptable, non-irritating and efficient fungicide. Most of the more potent agents are often irritating when used over prolonged periods of time.

When a patient consults us with the chief complaint of perianal itching it is our custom, in addition to the routine history, to determine if there are present elsewhere on the body fungal infections, however insignificant they may appear. The most common sites such as feet, ears and nails are carefully examined for fissures, scaling or vesicles. Not infrequently multiple areas of epidermophytosis are encountered. It is imperative that therapy be applied to all such areas simultaneously if satisfactory results are to be expected.

*Read in Section on Proctology, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

It is well known to allergists and dermatologists that skin hypersensitivity to fungi exists. In a susceptible individual a severe pruritus may resist all efforts aimed at direct relief, but will respond almost miraculously when attention is paid to some apparently innocuous lesion between the toes or elsewhere. Not infrequently the anal lesion will be culturally negative for fungi. Levin and Hyde have used the word "tricophytids" to describe these skin manifestations of trycophytin hypersensitivity. Fungous extracts have been prepared and used by intradermal injections for diagnosis and desensitizations. This work is still in the experimental stage, and probably has distinctly worth while possibilities.

Iodine is one of the most potent fungicides and is used nightly on distant lesions of hands, feet or ears. This drug is too irritating to use on the perianal skin save in exceptional instances.

The methods which we employ in treating pruritus ani are varied, depending largely upon the pathologic condition observed. However, a few general rules more or less applicable to all cases may be mentioned.

(1) Intelligent cooperation of the patient is essential and directions should be explicitly outlined. No preparations other than those prescribed are to be used without our full knowledge and consent. When the lesions have existed a long time the patient often has tried every remedy suggested by neighbors, druggist or physicians and usually has a well stocked medicine cabinet, the contents of which he may use with a lavish hand during a severe attack. By the unwise application of various remedies many cases of drug dermatitis are substituted for the original pruritus.

(2) The parts are to be kept as clean and dry as possible at all times. A soggy, macerated epithelium is more favorable for the growth of fungi. The incidence of secondary infection is also reduced by dryness and cleanliness.

(3) The patient is instructed to use moist cotton or toilet paper to cleanse the parts after defecation, as harsh toilet paper can produce abrasions and frequently precipitates an attack of itching.

(4) Coincident anal or rectal disease is corrected as necessary.

(5) We insist upon frequent examinations in order to ascertain the progress of the condition, to recognize a beginning drug irritation should it appear and to make changes in treatment as may seem indicated.

(6) Since certain fungi invade the deeper layers of the skin the infection is very difficult to eradicate completely and recurrences are common. For these reasons we recommend that therapy be regularly continued for several weeks after the symptoms have subsided. No case is considered cured as long as the skin remains thicker than normal (hyperkeratosis), although no abrasions or itching may be present.

Most of the cases we see are of long standing, though a few show signs of an acute dermatitis. In this latter condition itching is generally intense, and it is usual to find unmistakable evidence of scratching. Oftentimes large excoriated areas present themselves with an obvious secondary infection. For these, bed rest at home or hospital for a day or two may be necessary. Hot wet dressings of red mercuric iodide in a one to five thousand aqueous solution may be used more or less continuously and usually with very beneficial results. In some instances 5 per cent aqueous mercurochrome applied locally two or three times daily has given complete relief when other drugs seemed to aggravate the condition. Careful watch is maintained lest signs of drug irritation appear. In our experience the skin of blonds particularly is most sensitive. At the first indication of drug sensitivity wet dressings of boric acid are substituted for the mercuric iodide. If itching persists despite these measures, a pledget of cotton moistened with a solution of diothane or other local anesthetic may be applied with some relief. Occasionally these same anesthetics in ointment form are used. Ammoniated mercury and zinc oxide ointments are soothing and also fungicidal. Calomel ointment (one dram per ounce) has given excellent results in many intractable cases.

In the subacute and chronic varieties of the disease the parts may be moist and the epithelium macerated and sodden, or the skin may appear pigmented, dry, much thickened and contain numerous superficial fissures. Under these conditions stronger agents are employed. We rely chiefly on local applications of tincture of mercresin two or three times daily. These fre-

quently are supplemented with a dusting powder containing 5 per cent salicylic acid.

The extremely chronic cases with unbroken leathery skin are best treated with salicylic acid in an ointment or in an alcoholic solution. This will remove the excess epithelium and at the same time is an excellent fungicide. This then may be followed with tincture mercresin as above suggested. Applications of tincture of iodine, followed by alcohol, may be made with good effect in very chronic cases with thickening of the involved skin.

When all other measures have failed to give relief, and sometimes they do, we may resort to deep subcutaneous injections of one to two thousand hydrochloric acid solution or 1 per cent quinine and urea hydrochloride to produce a prolonged relief from itching, during which time local treatment is rigorously carried out. Some cases have shown dramatic relief following these injections, but we find it necessary to resort to them rather infrequently.

Some unresponsive cases will yield at least temporarily to x-ray, but as to the permanency of cures by this means there is much evidence of doubt. Recently superior results from the roentgen rays have been obtained by use of screens to permit longer exposure with deeper penetration and to eliminate most of the skin irritation. Of course local applications are to be made with some caution while x-ray treatment is in progress.

Pruritus ani may be complicated by a direct extension of the infection to the genitals; this usually responds favorably to the same treatment as outlined for perianal pruritus. Rarely we have seen the infection extend into the canal with resulting deep anal fissures. These lesions are very painful and great mechanical difficulty often is encountered in making adequate applications to them. Occasionally we find it necessary to resort to operation for this condition, but generally persistent local treatment will effect a cure.

Pruritus ani is not an easy disease to cure, though we believe that with adequate cooperation from the patient and with proper diligence and perseverance on the part of the physician, the large majority of cases can be permanently cured. To attain this result the importance of continued observation and treatment long after the subsidence of symptoms cannot be overemphasized.

500 Medical Arts Building

DISCUSSION (*Abstract*)

Dr. Maurice Lescale, New Orleans, La.—Someone has said there is no royal road to the successful treatment of pruritis ani and no method of treatment is successful in all cases.

In every branch of medicine, in all diseases, our prime consideration in planning a rational treatment is a thorough understanding of the etiologic background. But in pruritis ani we have uncertain and indefinite conditions confronting us. If we eliminate those cases of anal itching caused by eczema, excoriations due to irritating secretions of fistulae, and other frank skin diseases, and confine ourselves to the real and true pruritis ani, the so-called idiopathic pruritis ani, we are then forced to admit we know little concerning its etiology, neither the causative agent or the mechanism of its production.

It is hard even to define the condition we are discussing; some call it only a symptom, others insist that it is a disease entity.

While the question of etiology is of great natural and scientific interest, we as physicians are concerned primarily with the treatment of pruritis, the patient is concerned wholly and solely with treatment and the natural outcome and results of treatment. The many patients who hopefully undergo operations for the removal of hemorrhoids or/and other anal pathology, and then find their pruritis unimproved or even made worse by the operation, should make us cautious about advising surgery in these cases unless positively indicated, and more cautious about promising too much in the way of improving the pruritis.

I fully endorse Dr. Terrell's method, or system of treatment. It has much to commend it. Compared to other plans, many of which are heroic to say the least, his method, while tedious and time consuming, is not mutilating or painful to the patient, and is relatively simple for the physician to carry out. While at times the treatment may be long drawn out, it entails no expensive hospital stay. Of course, the hospital expense should be secondary to the final cure, but many times after hospital procedures for the relief of pruritis the case remains uncured.

In many of my cases I follow a plan of treatment similar to Dr. Terrell's. I use one of the salts of mercury in various forms. The treatment does not cure all cases. Neither does any other plan; but, it does relieve a large percentage.

It benefits cases of Trichophyton infection, whether diagnosed as such or not.

It benefits cases of trichophyton infection, whether speaks of as associated with a special tendency to perspiration around the anus and buttocks which have a resultant damp condition of the skin, producing pruritis.

MENTAL HYGIENE ASPECTS OF PEDIATRICS*

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The young pediatrician with several years of hospital training behind him is thoroughly capable of taking care of any physical ailment that may be brought to him for advice. However, he soon finds that a very large percentage of his patients are brought to him not for physical ailments, but because of disorders of conduct, personality and habit, and unless his hospital training has included special training in mental hygiene he feels very inadequate when confronted by them. Conduct disorders would include such things as negativism, tantrums, irritability, cruelty, disobedience, lying. Personality disorders would include excessive shyness and timidity, day dreaming, hyperactivity, stubbornness and unpopularity. Habit disorders would include enuresis, soiling, masturbation, thumb sucking, habit spasms and anorexia. Most of these conditions lie on the borderline between psychiatry and medicine and most of them are better treated by psychiatrists than by internists or pediatricians. However, they are brought first to the latter because people usually first consult their medical advisers about anything that suggests a medical difficulty.

Most internists and pediatricians would be glad to enlist the aid of their psychiatric friends in diagnosing and treating such disorders, but it is not practical to do so. The patients usually do not consider the conditions serious enough to require consultation and would rather get along as best they can with a few kindly sympathetic words from the physician they know best. This puts the internists and pediatricians "on the spot," as it were, and it is up to them to inform themselves of these disorders so they can give good advice. The number of cases is undoubtedly increasing, probably due to the increasing complexity and speed of civilized life and to the lack of normal opportunity for recreation. This is especially true of pediatrics, because children suffer more from such things than adults do. Also the public is becoming more conscious of the importance of this field and disorders of conduct, personality and habit that were formerly treated by family consultation and sewing circle advice are now being brought to physicians. If physicians are not prepared to give satisfactory advice the patients will turn back to non-medical sources of information.

A practical difficulty about this type of work is the great amount of time entailed in getting the facts of the history and in discussing treatment. Most patients are not willing to pay for this extra time. It has been suggested that trained psychiatric social workers might be employed to get the histories and visit the homes to investigate conditions and get the "low down" on family life, which can be gotten only by repeated long visits.

It is the purpose of this paper to discuss briefly the causes and treatment of some of the commoner disorders of conduct, personality and habit that are likely to seek medical advice.

DISORDERS OF CONDUCT

(1) *Negativism.*—This is the commonest conduct disorder that we see and consists of the child's doing just the opposite to what he is told. It is especially common from 2 to 4 years, but it can be found from birth to senility. Negativism is the result of unsuccessful methods of control and constitutes rebellion against authority. It usually involves a clash of personalities. It is likely to happen when too many persons give orders as when one or two children grow up among a large number of adults or when one person gives too many orders and does not see that they are obeyed. Also it may occur when a person shows an intense desire for a child to do a certain thing such as eat or use the toilet. Negativism may be the cause of any of the habit disorders, enuresis, encopresis, psychogenic vomiting, psychogenic constipation, and anorexia.

The treatment of negativism consists of separating if possible the clashing personalities, or if this is impossible, of educating the parties concerned to the realization of the dangers of such clashes and convincing them of the necessity of their cessation.

The following 3 points are helpful in preventing or treating negativism:

(1) The caretaker of the child (parent or nurse) must be in complete control of its own emotions. Children do not take orders well from an emotional person.

(2) Do not try to play the leader in the child's life. Children have plenty of initiative and would rather do their own leading and resent

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

being led. Be an umpire and see that games are played fairly, but do not lead.

(3) Do not interfere with a child's activities unless it is interfering with someone's rights or is in danger of hurting itself or of destroying property.

Tantrums appear early in life as breath-holding spells. A baby gets hurt or is denied something and flies into a rage and holds its breath until it gets cyanotic and faints. The parents are terrified, and as the child gets older it finds it can get anything it wants by holding its breath. Children do not die in such attacks and the less attention paid to them the better. Head banging is a form of tantrum which appears at 2 or 3 years. It may also be an attention-attracting device. Here the child gets angry and bangs its head against the floor until it looks as if it would fracture its skull. Complete indifference and isolation in a quiet room is the best treatment.

Irritability is a very common disorder and the cause of it may be extremely difficult to find. Irritability is nearly always the result of fatigue or unhappiness. Fatigue may result from organic disease and every child presenting this symptom should have a careful physical examination and laboratory study. Diseased tonsils and adenoids, tuberculosis, rheumatic heart disease, pyuria and intestinal parasites are a few conditions, the outstanding symptom of which may be irritability. The child's routine for the day should be minutely inspected: the times for arising, meals, going to school, recess periods, afternoon activities, going to bed. Frequently a child is fatigued and irritable because it is driven and overstimulated by too heavy a schedule of work and play and insufficient rest. It is just as impossible to say how many hours of rest a child should have as it is to say how many tablespoons of cereal it should eat. Individuals differ in their rest requirements and it is the physician's job to determine as best he can when a schedule of living is too strenuous for his patient.

The causes of fatigue, however, are much simpler to discover than the causes of unhappiness. In our search for the cause of unhappiness we must consider the whole of the child's environment, its relations with school, playmates and teachers, with its parents and brothers and sisters, its likes and dislikes, successes and failures. We might mention a few causes of unhappiness in children. Quarrelsome homes where harmony does not exist and children are made unhappy and irritable partly from a feeling of insecurity, partly from imitation and partly from self-defense. Domineering parents usually have unhappy homes. Domineering may be done in a kindly or unkindly way, but the results are generally bad. The children either submit to domination and never develop or they rebel and do things that fill their parents with dismay. The only child who is dethroned by the arrival of a new baby often becomes irritable and unhappy because of the loss of accustomed attention. The over-solicitous, apprehensive parent makes its children unhappy with unwanted attentions and unnecessary fears. It might seem strange to say that one would have difficulty in differentiating irritability that comes from unhappiness from living in a disorganized, quarrelsome home and irritability that comes from fatigue from early tuberculosis. However, I recently saw just such a case, and it was only after a month of observation in a well organized nursery school that I became convinced the child had no organic disease.

PERSONALITY DISORDERS

Excessive shyness and timidity may occur where a child's spirit is crushed by the domination of a parent, or they may be due to imitation of abnormal fears of an over-anxious parent. Also nurse maids sometimes frighten children to make them obey and to make them keep still at night. Sometimes abnormal timidity dates from an actual shocking experience.

Day dreaming is a common personality trait in children. A certain amount of it is physiological. However, day dreaming is escape into the realm of unreality and is an unhealthy mental activity which should be controlled by keeping the child busy. Sometimes day dreaming is an evidence of unhappiness, sometimes it is a pose. It may also be a symptom of organic disease.

Hyperactivity is rarely an evidence of disease. On the contrary, it is usually evidence of very good health. However, it may be indirectly responsible for various nervous disorders. The mother of the hyperactive child is usually in such a state of physical and mental exhaustion that she is very irritable and uncompromising with the child. That brings out such nervous habits as nail biting, habit spasms or enuresis. We recently had such a case of enuresis in the Habit Clinic which improved greatly when he

was placed in a quiet, well-ordered environment where he had plenty of interesting things to do.

HABIT DISORDERS

Enuresis always comes to mind first when we mention habit disorders. Most of the drugs in the pharmacopeia and many operations have been done for the relief of enuresis and with the possible exception of atropin I do not believe any of them have done any good except in so far as they have increased the self-confidence of the child that it could overcome the habit. Many causes have been given for enuresis such as alkaline urine, acid urine, long foreskin, tonsils and adenoids, and intestinal parasites. I doubt that any of these has a close connection with enuresis. Enuresis is probably caused by a number of different things. It may be a reversion to the infantile level in a child who had not wet the bed for years. This may happen when a new baby is born and the other child in his jealous desire to hold on to the attention he formerly had will revert to the infantile habits of baby talk and wetting the bed. Cameron says that enuresis is a form of hysteria and results from intense desire not to wet the bed and fear and embarrassment over the consequences. In support of this point of view he cites numerous instances where enuretic boys became much worse when they went to boarding school where their unfortunate habit was held up to pitiless ridicule by the other boys. Enuresis is also undoubtedly due to the fact that some children sleep so soundly that normal bladder stimuli do not wake them.

The treatment of enuresis is a long, slow, uphill pull with many setbacks and much discouragement. It is important, of course, that the child should have a minimum intake of fluid for 3 hours before bedtime; also that he should have no exciting play during that period. It is thought that bladder control may be encouraged by having the child start and stop the flow of urine on command and by holding the urine as long as possible in the daytime. All these measures are helpful, but it is also important to be sure the child wants to stop the habit and to encourage it in every way to believe that it can. From this point of view punishment is entirely out of place and is apt to make it worse. I cannot see how punishment can help enuresis except in those cases of voluntary reversion to the infant level.

Soiling or defecating in the clothing or in improper places is a disgusting habit and is fairly common. This may be due to reversion to the infant level and to desire for attention or it may be a contest or game between mother and child. I have recently seen two children aged 2 and 3 years who would furtively watch their mothers until they were out of sight and then quickly move their bowels on the floor. It would seem as if punishment would stop the habit and yet it had had no effect in the cases mentioned.

Many children indulge themselves in autoerotic habits which involve pleasurable stimulation of sensory nerves. Examples are masturbation, thumb sucking, tongue sucking, umbilicus rubbing and head rolling. These habits frequently excite intense alarm or disgust among the adults of the family which magnify the importance of the habits in the eyes of the children and make them much harder to eradicate. Since masturbation is the outstanding habit of this group, we shall limit our discussion to it and merely state that the same principles apply to the others.

In the first place the parents must be convinced that masturbation is a common and usually harmless habit; that it will not make the child insane or a sex pervert or an immoral person; that the exhibition of alarm or disgust on their part is more apt to intensify the habit than abolish it. Their attitude should be one of mild disapproval. Psychopathic personality is often associated with masturbation, but as cause rather than as effect.

The child should be told the habit is an example of bad manners like picking the nose or biting the nails. It should never be threatened or shamed or punished, as this makes it secretive and deceitful and usually does not stop the habit, but on the contrary is apt to make it worse by concentrating attention on it.

Methods of restraint are rather successful with infants, but usually entirely unsuccessful with older children. They should never be told what the restraints are for, but on the contrary some entirely different reason should be given for their application. The purpose of restraint is to prevent the habit for a long enough time (probably several months) for the child to forget about it. If the child knows the purpose of the restraint it will serve as a reminder of the habit.

Local applications such as local anesthetics and operations such as removal of the clitoris or circumcision do little good, and it is most important that the child should not know that

these things were done to cure his habit, as they will then be likely to center his attention on it and make it worse.

Tics or habit spasms are motor manifestations of psychic irritability and excitability. They are very common in nervous hyperactive children. They originate as exaggerated efforts to relieve some local irritation such as blinking the eyes or stretching the mouth and continue on until they become habits. They may be hard to differentiate from chorea. They have no particular association with rheumatism.

Since tics are always found in excitable nervous children, it is important that their lives should be regulated so there is the proper relation between work and rest and play. They need more rest and much less excitement than normal children. Attention should never be called to the tic except to say occasionally in an encouraging way that it is getting better.

Anorexia has since the Great War been the most common complaint that has brought children to doctors. The great increase in anorexia in the postwar years was a direct result of the surge of public interest in child welfare which occurred at that time. Most anorexia at the present time results from rebellion of the children against the determined efforts of parents and doctors to make them eat more than they want. A great deal of it is also caused by desire for attention. Why should a child eat while he can make grandmother dance a jig or father pay good money by refusing to do so? The frequency of anorexia has somewhat abated in the past few years since the knowledge of its cause has been more widely disseminated. Some anorexia is due to organic disease and careful study should be made of each patient that presents the symptom.

Treatment of anorexia of psychological origin has become rather well standardized along the following lines:

(1) No distraction should be present in the room where the child is eating. Ordinary conversation is very distracting to children and for this reason children less than 5 years old eat better with other children or alone, with one attendant. Radios, animals and persons coming and going are very distracting.

(2) Do not coax a child to eat or threaten it with punishment. Take a disinterested attitude. With younger children up to 2 or 3 years it is permissible to hold food up to their mouths, but do not try to make them eat it.

(3) A time limit of 20 to 30 minutes should be set, after which the meal is over and the dishes are removed without comment.

It is impossible in a paper of this length to do more than sketch an outline of this subject. I have no statistics to back my opinion, but I believe most pediatricians will find disorders of conduct, personality and habit constitute a good size portion of their practice. Their occurrence is particularly prevalent among the so-called upper classes of society. The cases are frequently difficult to diagnose and always difficult to treat. Results are slow and discouraging setbacks frequent. One of the hardest phases of the work is convincing parents that the difficulty is mental and not physical and enlisting their continued and intelligent cooperation and confidence.

DISCUSSION (*Abstract*)

Dr. Horton Casparis, Nashville, Tenn.—In the first place, I want to register a complaint against the use of the term "hygiene" in connection with behavior and urge the adoption of the term "health." For, as we use the term hygiene today I do not believe it is quite appropriate to think of behavior as being hygienic or unhygienic, but on the contrary if we speak of behavior as being healthy or unhealthy then we are employing a word the significance of which is familiar to all. We thus immediately relieve this whole subject of some of the vagueness and confusion surrounding it, and hence tend to pave the way for more confident acceptance of responsibility among those interested. In other words, it seems to me that we should put good behavior of the whole child (mental health) on the same plane as we place good behavior of the body or any part of it (physical health) since they are indissociable, and think and speak of both of them in terms of being healthy or unhealthy.

If Dr. Bruce and I as pediatricians have any particular virtue in connection with this subject and discussion, it is our interest. We are trying to learn how to promote the healthy behavior of infants and children, and in our attempt we are going to need not only the help of you psychiatrists, but also your patience and forbearance. The gap between pediatrics and psychiatry must be filled in. In the pediatrician's attempt to help fill in that gap, it seems to me, there are three main aspects of the subject which must be considered. In the first place, since he so often has access to the child from birth, there is a wonderful opportunity to carry out purely preventive work as he learns to assume responsibility in this field. In the second place, as Dr. Bruce has said, there are large numbers of children with lesser behavior problems whose parents do not consider their condition serious enough to consult a psychiatrist. Many of these minor problems the pediatrician himself must learn to straighten out. And, finally, pediatricians must recognize the fact that there are children who could be greatly benefited by psychiatric consultation and advice, and that he as a pediatrician can give the best care to these children only through working in close cooperation with the psychiatrist.

Dr. Erwin Wexberg, New Orleans, La.—The standpoint of the psychiatrist who mostly is dealing with

grown-up patients differs from that of the pediatrician and of the child psychiatrist. Obviously, the former's point of view must be biased by his observations which show him that a large number of his grown-up patients have started out with severe behavior difficulties in childhood. This certainly is true. However, on the other hand, the pediatrician knows exactly as child psychiatrists do that out of many hundreds of cases of problem children there may be one which later on turns out to be a case of epilepsy, schizophrenia, criminality or severe psychopathy. There is no way of recognizing that single case among the large number of others in which maladjustment in childhood is not caused by heredity and can be cured by adequate treatment. The old saying that "the apple does not fall far from the tree" may be true, but mostly only in the sense that the unwholesome atmosphere in a home directed by neurotic parents often accounts for equally nervous children.

THE TREATMENT OF DRUG ADDICTS AT THE LEXINGTON HOSPITAL*

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and
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The Lexington Hospital has afforded a unique opportunity for the treatment and management of drug addicts. Nowhere else has there been a similar combination of physical, medical and administrative legal facilities for attacking the problem. The hospital was designed both for treatment and research and the designers of it had in view the possible benefit of a well-rounded program of treatment, including work, recreation and social service, as well as the medical treatment. It was opened for the reception of patients in May, 1935, and to date upwards of 3,000 addicts have been admitted to it. The bulk of these patients have been Federal prisoners, but the hospital also treats probationers and voluntary patients who are addicts. The probationers are persons who have been convicted in Federal courts and placed on probation for a definite period with the added provision that they present themselves at the hospital and stay within the limits of that period until pronounced cured. Any citizen of the United States addicted to narcotics* is eligible for treatment as a voluntary patient, but at present there are no facilities for women.

After the advent of Federal measures for narcotic control, and, more particularly, after the Harrison Act became effective in 1915, addicts had been treated as persons to be punished by incarceration in prisons rather than as patients to be cured. The hospital grew out of the realization that such treatment often defeated rather than furthered rehabilitation. But, viewing the narcotic problem from all angles, it was thought desirable to retain control of addict violators so that they could be given adequate treatment while held in restraint, the idea being to treat violators as patients under legal restraint and to relieve them as far as possible from the stigma of prison. Possible restraint is an added motive for continued cure, and actual restraint enforces treatment on some patients who otherwise would never take adequate treatment. The treatment of voluntary patients takes care of that large body of addicts who because of financial or other reasons could not get adequate treatment elsewhere.

The permanent rehabilitation of drug addicts of the present day is not an easy problem. It appears that in the United States the majority of addicts have been recruited from among persons who are unstable, and therefore more or less difficult to cure permanently. The severity of the narcotic laws, the difficulty of getting hold of adequate supplies of the favorite opiate, and the low esteem in which addicts are held have tended during recent years to eliminate either by prevention or cure those persons who are easily curable, so that physicians are confronted with more difficult cases as time goes on. Many cases seem to be hopeless, but in the absence of organic deterioration one should never despair of effecting eventual cure. Many of the apparently hopeless cases are so only because of inadequate treatment, improper management under treatment, or the unfavorable environment to which they are eventually returned.

Some addicts have taken a fatalistic attitude towards their habit. These usually have made a complete failure of life through repeated relapses and because of several jail sentences, and they know of others who have done the same

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

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*Note.—Under the law establishing the hospital only those persons are eligible for treatment who are addicted to opium, coca leaves, cannabis indica or peyote, or some of the various derivatives, alkaloids, salts, compounds and preparations of one of these drugs.

thing, and say of successful permanent cure that "it can't be done." Such patients may have gained 20 or 30 pounds in weight under enforced abstinence of six months or a year and may be in perfect health physically. Their attitude is a rationalization of their weaknesses. They need to have confidence in themselves restored and to be convinced that they at least subconsciously do not desire to be cured. There are not many cases like this. The great majority of relapsers leave the hospital with too much confidence in themselves and in consequence do not avoid the pitfalls lurking in alcohol and tempting environments. A few addicts frankly say that they do not intend to abstain from narcotics. This is the type that connives for the introduction of narcotics into institutions. They usually have had criminal careers before they became addicts and treatment of them by any known method is practically hopeless.

Treatment is divided into three stages: the withdrawal treatment; building up the patient physically and mentally while still in the institution; and adjustment of outside conditions in preparation for his eventual return to society.

Practically all the addicts who come to this institution are afflicted with some form of opiate addiction and the first step in treatment is, naturally, withdrawal of the drug. This is a simple procedure that has been discussed in another paper[1] and we shall not refer to it here except in a general way. The bulk of literature on the treatment of drug addiction is concerned only with the withdrawal stage of it and many methods have been invented to carry the patient through this stage. Some of these methods are harmful, especially those that have been most widely written about; a large proportion of them are useless, and all are successful provided the opiate is withdrawn and the treatment is not so strenuous as to kill the patient, a result that is too often achieved. The acute stage of withdrawal is usually over within 10 days and the patient is well on his way to physical recovery, but studies now being made at Lexington seem to indicate that physical readjustment to abstinence is not complete for several months after the last dose of opium. During this period if some extraneous disturbing physical condition arises, a certain amount of retrogression of the adjustment to abstinence occurs, and, if access to opium is easy, relapse may occur both because of this and because of the emotional imbalance with which most of these patients suffer.

No form of drug therapy has any effect in obliterating the so-called craving for narcotics. The physical craving eventually passes off regardless of the drug treatment used during the acute withdrawal period, but a certain amount of physical craving will persist if hypnotics or strongly sedative drugs are continuously prescribed and the patient who wants to be cured has to contend with this as well as with psychiatric factors that have a tendency to produce relapse. Withdrawal of the opiate is, then, only the beginning of a treatment, the ultimate aim of which is to bring about a healthy adjustment to life without drugs.

Time is an important factor in the treatment. Under prolonged abstinence the habit of relieving distress or restlessness by narcosis fades into the background while more helpful habits of adjustment are being formed through work and controlled recreation. During this time every irritating physical condition is removed if possible and psychotherapy is administered to those most likely to be benefited by it.

ADMISSION STUDY

In developing a plan of treatment for the individual patient over an extended period, a complete study is made of him during his first 30 days residence in the hospital, during which time he is housed in the receiving section, one ward of which is set aside for withdrawal therapy. Withdrawal is delayed, however, until it is ascertained what degree of habit the patient has and whether he is suffering from some serious organic disease. The study may require several days and patients found to be suffering with organic disease, especially heart disease or infirmities incident to age, are withdrawn more slowly than physically robust patients. The determination of the degree of habit is important both from the standpoint of treatment to be given and the accuracy of certain research studies that are necessarily based upon patients with a certain degree of habit. The majority of patients obviously have very mild habits and no attempt is made to stabilize them if they are physically normal, but the treatment is begun immediately, and usually without administering opiates. Patients with inoperable cancer causing pain are not withdrawn. The same applies to those suffering with tabetic crises unless there is a remission in the painful attacks, but patients suffering with asthma, migraine, chronic arthritis and curable tuberculosis are withdrawn, and they are al-

ways benefited by it. Advanced incurable tuberculous patients may be continued on codeine. There is nothing more detrimental to a curable tuberculous patient than to give him morphine continuously. Such patients, when relieved of their habit, gain weight rapidly and as a rule do not cough any more than when they were taking morphine.

During the first 30 days the patient receives the usual routine work-up accorded the seriously ill in general hospitals. He is seen daily by the ward physician and, when indicated, consultations are held, one purpose of which is to discover, with the idea of remedying, any condition upon which his attention might be focused or which might weaken his resistance through physical or mental irritation. Included in this program is a thorough study and remedy of the condition of the mouth, addicts being notoriously afflicted with dental caries and oral infection.

A psychiatrist is assigned full time to each newly received patient in order to carry on a neuropsychiatric study concurrently with the physical study. In making his study the psychiatrist has access to the records of the social service department, which department contacts the immediate family, relatives, postmasters and social service bureaus and exchanges for information about the patient. The information thus received is of inestimable value. It is often at variance with the patient's own account of his past and is, of course, occasionally colored by a more or less vindictive attitude on the part of the informants. The observations of the psychiatrist are incorporated into the ward record and near the end of the 30-day period he prepares a report in narrative form and in simple language so that it may be understood by members of the classification board, the majority but not all of whom are trained psychiatrists, and by certain administrative officers who have occasion to review the record.

The thorough psychiatric and social study has grown out of the viewpoint that the relapsing drug addict is a problem in mental illness and a complete understanding of him by the psychiatrist is necessary if his difficulties are to be solved.

CLASSIFICATION

At the conclusion of the first 30 days the case is brought before the classification board, which board is made up of the executive officer, the clinical director, the staff psychiatrists, the psychologist, the chief nurse, the chief custodial officer, and the registrar. The board reviews all information available about the patient, interviews him on certain features suggested by the assembled reports, classifies his case, and establishes an initial program for him. The classification and the program are followed unless and until changed by the reclassification board, which is a committee of the classification board empowered to make minor changes as suggested by additional information obtained through further observation and study.

The psychiatric classification used is essentially that given by the senior author in 1924 after an intensive study of 230 cases.[2] But based upon experience gained by a study of the first 1,750 admissions, the staff of the Lexington Hospital slightly modified and further clarified this classification in January, 1937, so that addicts are now classified as follows:

(1) *Normal Individuals Accidentally Addicted.*—This group includes persons of normal nervous constitution accidentally or necessarily addicted through medication in the course of illness.

(2) *Psychopathic Diathesis.*—This group includes individuals who show psychopathic dispositions or tendencies characterized by behavior resulting from misinterpretations of environmental settings or situations, but not a well-crystallized personality defect.[2]

(3) *Psychoneurosis.*—This group includes individuals suffering with the ordinary types of psychoneurosis.

(4) *Psychopathic Personality without Psychosis.*—This group is composed of persons who show deviation of personality usually expressed as constitutional psychopathic inferiority, psychopathic personality, or constitutional psychopathic states, where volitional and emotional control are gravely distorted from the normal.

(5) *Inebriate.*—This group includes individuals in whom alcoholic indulgence, either periodic or more or less continuous, played an important role as a precipitating factor in their addiction. They apparently have a so-called inebriate impulse.

(6) *Drug Addiction Associated with Psychosis.*—This group includes addicts suffering with frank psychosis, organic, toxic or functional.

Theoretically a seventh group should be included to complete the picture, namely, psychosis caused by opiates, but to date no such case has been observed at Lexington.

The application of the above system of general classification furnishes statistical informa-

tion relative to the predisposing causes of drug addiction. It also provides an additional motive for intensive study of the individual in order that he may be thoroughly understood and effectively treated. In some instances the correct classification cannot be made at the first appearance of the patient before the board. Such cases are remanded to the board at a later date. A condensed report prepared as the result of the deliberations of the classification board furnishes the basis for subsequent handling of the patient.

PROGRAM

The program established for the patient includes, in addition to psychotherapy and other medical treatment as indicated, occupational therapy, recreation, reading and a grade of custody or supervision. Intensive psychotherapy is given only to selected patients, as time does not permit application of such therapy to all patients who might be benefited by it, but all receive some form of psychotherapy in that they are regularly seen by physicians and are supervised by trained nurses (male guard attendants) who have been taught to observe and report upon unusual behavior and to assist patients by encouragement and persuasion when such methods seem to be indicated.

As far as possible the occupational therapy administered is regular employment at an occupation not unlike that which the patient might pursue if he were living on the outside. The maintenance needs of the hospital, a farm of 1,050 acres, a tailor shop in which all clothing used by the patients is made, and other shops furnish a variety of occupational activities suitable to the needs of any type of patient. The farm with the many demands of a completely diversified system of crop production and animal husbandry, including dairying and slaughtering, together with landscaping and construction, offers an abundance of open-air work opportunities that are considered especially beneficial to a convalescing drug addict. The variety of work is such as to permit within prescribed limitations a choice of jobs. The patient is also permitted a change of jobs from time to time when the reclassification board feels that a change would be beneficial from the standpoint of further promoting his adjustment. Chronic invalids and psychotics are given more formal occupational therapy such as weaving and woodcarving under the supervision of an occupational therapy aide.

In order to avoid as far as possible the disturbing effect of idleness on the efforts to build up resistance and to provide ample sleep and rest, the program includes provision for simple games, reading and radio between the close of the regular day's work and bedtime at 9:30 p. m., when all activities are stopped. But no patient is forced or nagged into engaging in any recreational activity. Provision is made, however, for certain competitive sports which are believed to be generally beneficial.

SUPERVISION

The classification necessarily includes the grade of custody and supervision. Four grades of supervision have been established: maximum, medium inside, medium outside, and minimum. The majority of drug addicts are weak rather than vicious. They need to be supervised rather than repressed, and with this idea in mind the supervision exercised here is sufficient to prevent prisoners from escaping and to prevent both prisoners and voluntary patients from introducing contraband. It applies to voluntary patients as well as to prisoner and probationary patients, and includes the censoring of mail, the prohibition of the introduction of gifts of food or clothing from the outside, the prevention of patients leaving the reservation, the supervision of visits, as well as the regulation of hours and type of work and play. In general, there is an established routine for each patient which he is not allowed to change without authority, but the restraint imposed upon him is never as severe or as irksome as it is in prisons, and he is always made to feel that what is done is to cure rather than punish him. Repression and supervision beyond what is necessary create an atmosphere of suspicion and resentment that is bad psychologically, whereas a certain amount of supervision and watchfulness is considered by the patients as necessary and is appreciated by them. Our aim is to give just sufficient supervision and be more and more liberal, as the patients deserve it, so that living conditions within the institution are approximated as nearly as possible to those on the outside. In other words, the trust embodied in patients and the responsibility put upon them are character building. In pursuit of this program we have found it possible to be much more liberal with addicts than was thought possible in prisons. The supervisors of work details are essentially foremen, and dormitory attendants are more nearly like house managers than guards. Over 40 per cent of the patients have a minimum grade of supervision. Patients in this large trusted group go to and

from work, and work at their assignments days at a time without contact with guardians. There are, however, some non-conformists who would escape or introduce narcotics. The attendants are always in the background to prevent these accidents, but the prison atmosphere is reduced to the lowest possible minimum consistent with safety.

Voluntary patients are accorded the same treatment as prisoners. They may demand their release and receive it, but so long as they stay at the institution they must conform to the established routine.

DISCIPLINE

Infractions of discipline are becoming less frequent as the patients, many of whom have spent time in prison, realize that they are being treated as sick individuals rather than as prisoners. Coercion has no place in the mental readjustment of narcotic addicts, especially that form of coercion that inflicts penalties for certain attitudes and acts that are of little consequence in themselves and are recognized as such by the patients. But requiring certain lines of conduct and behavior that are necessary for the orderly adjustment of the patients to one another and to the hospital staff is not regarded by the patients as an unreasonable coercion and is of definite benefit to them in that it trains them to conform to reasonable procedures.

When a patient misbehaves a report is made of the circumstances by the witnessing attendant or physician. The case is then brought before a board for special study and recommendation. The general policy is to regard all infractions of discipline as mental maladjustment and to find a solution that will bring about a satisfactory readjustment. In many instances this means a rather prolonged period of daily observation in a simplified environmental set-up under the guidance of one of the psychiatrists. Such cases are gradually returned to a more or less normal environment by the use in some instances of the trial and error approach. If the adjustment happens to be not complete as shown by continued difficulties, the individual continues to return to the psychiatrist for further study and treatment. The approach to the disciplinary cases is dominated throughout by the viewpoint of the psychiatrist, and punishment for violation of rules plays no part in the scheme. To be placed under the observation of a psychiatrist in a section of the building set aside for patients who are not able to conform, often creates in such patients a feeling of failure and a desire to do better, whereas the contrary feeling of abuse with desire for revenge is always engendered by an approach dominated by the viewpoint of punishment.

VOLUNTARY PATIENTS

Voluntary patients commit themselves, agreeing to stay until the staff of the hospital pronounces them cured, and the policy at first was to keep them from six months to a year, but a Federal court has voided the authority for holding voluntary patients after they demand their release. As a result of this, a large proportion of them leave before their treatment is completed. Many of these would be benefited and possibly permanently cured if they could be compelled to stay. Those who leave invent various reasons for desiring to do so, but the most usual one is that they must look after their families. Not uncommonly members of the family of a patient who has been a financial and social burden to them for years will write urging that he be kept at the hospital, while at the same time the patient is demanding his release so that he can go home and save the family from starvation. Such patients are usually hopeless in any event and nothing is lost by their departure, but other more cooperative patients, who really desire to be cured, become emotionally disturbed before complete physical readjustment to abstinence is established and before they become accustomed to the hospital routine. In this state they change their minds about the desirability of going through with what then promises to be an irksome period of prolonged institutional life. Many of these cases would be permanently benefited if they could be persuaded to stay. Illustrating this, and also the importance of time as a factor in cure, is the following case:

A 28-year-old man with bad heredity, together with alcoholism and drug addiction in his father, was raised without discipline by his grandparents. He inherited considerable wealth, was allowed all the money he could spend and consequently spent all of the fortune except some that was so tied up he could not get his hands on it; kept dissipated company; deserted from three military schools; acquired syphilis; began to drink excessively at 18; and finally became addicted to morphine two and one-half years before admission through taking the drug to sober up from sprees; and had three previous treatments followed by relapses. He demanded his release a few weeks after admission to the Lexington Hospital, claiming he was cured and had business to attend to, but he received no encouragement from his family and was compelled to stay in the face of threats to employ a lawyer and secure release through the court.

His attitude gradually changed so that he was willing to stay until cured, and after six months he was made a trusty on the farm. He was discharged as cured 21

months ago and since then has married and settled down to a normal life of a farmer without dissipation with either alcohol or drugs.

If this patient had left the hospital early in the treatment as he wanted to do he would certainly have returned to a life of dissipation and drugs.

AFTER CARE

The period of treatment of sentenced patients is placed at a maximum by the court and at a minimum by the United States Parole Board, whereas the duration of treatment of probationer patients is purely a matter for the staff to decide. The staff has an additional hold on sentenced patients in that it may hold them beyond their short-time date if they are not considered to be completely cured. All paroled cases, cases released on the short-time date, and probationer cases are under supervision of the United States probation officers for definite periods after they are released from the institution. This gives an opportunity for the supervision of discharged patients not essentially different from the supervision exercised over other Federal prisoners, but probably of much more importance in the case of drug addicts. Some time before the patient leaves the hospital an attempt is made to find a job for him in a suitable environment at which he may work and get a start on the road to normal living during the period of supervision. Our social service department makes every effort to promote a helpful attitude on the part of relatives, friends and officials towards the patient and an active correspondence of staff members with former patients is definitely encouraged.

The environment to which addicts return is an important determinant of whether or not they will relapse. Their innate weakness is difficult to overcome, but if they can be supplied with work in an environment that has a minimum of irritation and temptation the prognosis is always good, whereas a life of idleness in an environment saturated with alcohol and drugs is more than the average addict can withstand. Showing the importance of environment is the following case:

A man now 60 years old, an electrician and mechanic, born on a farm and raised in an orphans' home, never married, but lived in rooming houses and cheap hotels in an environment where there was gambling, dissipation and drug addiction. He began to smoke opium at 30 and shifted to morphine eight years later. He served four short jail sentences for minor offenses and five penitentiary sentences for drug law violations, always returning to the old environment and promptly relapsing. He had some disciplinary trouble in prison, but was never regarded as a vicious character.

After a period of study here he was made a trusty in a position that carried some responsibility. Arrangements were made for him to go on discharge to a position in a non-tempting environment in the neighborhood, and the staff physician who had looked after him in the hospital continued to see him occasionally. He has done well, and some months later gave as the reason for his eventual cure that this was the first time he had ever been treated with any kindness in an institution. But the environment to which he went was doubtless the most important factor.

END RESULTS

The problems presented by the management of drug addicts at this hospital, complicated as they are by certain legal aspects, make an accurate estimate of end results well nigh impossible at this time. Certain impressions gathered, however, seem to indicate the effectiveness of the above program.

The physical condition of patients is practically always remarkably improved and their power of resistance to influences that tend to cause a reversion to narcotics is strengthened in a large majority of cases, but we cannot hope to erase in all cases fundamental defects to the point where they may not become manifest again when the patient afflicted with them is subjected to severe environmental stresses. The medical approach to the patients while they are in the hospital with the absence of any vindictive attitude towards them has tended to promote a willingness to enter into a fairly free and frank discussion of their problems after they leave, and the facts gained from correspondence, together with occasional interviews, are thought to be fairly reliable and are encouraging.

The results seem to justify the conviction that the management of drug addicts as patients who are mentally ill is logical. We certainly do not believe in long prison sentences as an aid to their rehabilitation.

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DISCUSSION (*Abstract*)

Dr. W. D. Partlow, Tuscaloosa, Ala.—Dr. Kolb's full appreciation of the background from which the problem of drug addiction comes, his grouping of cases on a basis of history and individual study, his visualizing three stages of treatment in (a) withdrawal, (b) building up physical and mental status, and (c) readjusting to outside environment, and his further reserve and hesitancy in pronouncing high percentage of favorable prog-

noses, all indicate that he speaks from a thorough understanding of the whole problem of drug addiction. I, therefore, shall not attempt to add anything to what Dr. Kolb has forcefully portrayed, but shall undertake to elaborate on a few of his ideas and suggestions.

(1) Among the great number of drug addicts passing through our state institutions within the past 30 years, only a small percentage suffer from drug addiction alone. In a very high percentage the drug addiction is merely one of the symptoms or expressions of underlying constitutional deficiencies and defects, as may be stated also in a less degree of the other social problems of crime, delinquency, dependency and alcoholism. When we eliminate the relatively small percentage of drug addicts attributed properly to definitely incurable conditions as cancer or advanced diabetes, we yet have left the vastly larger percentage of the sufferers of drug addiction who are such because of either constitutional psychopathic personality or neurasthenia or psychasthenia. Thirty per cent of constitutional psychopathic personality drug addicts take to drug addiction as they do to alcoholic excess, lying, stealing, crime and other irregular behavior. The neurasthenic or psychasthenic, being either physically or mentally uncomfortable, resorts to opiates or alcohol to anesthetize feelings due to such a constitutional defect in an effort to relieve his physical or mental discomfort.

(2) Prognoses must be guarded with much reservation on the ground that no treatment can hope to leave the patient in better condition than the initial dose of habit-forming drug found him. If he took to drug addiction as an outlet in the first instance, it takes a strong set of positive environmental influences to protect and guard him from relapse or recurrence.

Social service cooperation is most important. One cannot determine the type of case he has as a drug addict from the history given by the patient himself. All psychopaths and neurasthenics are adepts at deception and would lead the psychiatrist to believe that others, including physicians or associates, were responsible for the beginning of the habit. For a favorable prognosis also it is important to have the patient anxious to recover and definitely resolved to cooperate and to rid himself of the habit. I have in many instances had patients tell me that they had no desire to be rid of the habit since it was in the use of drugs that they got the greatest pleasure of life. Without opiates life was gloomy and with opiates everything rosy, hence, by their reasoning, "why be unhappy and miserable when morphine may produce the opposite in mental joy and physical well-being." Such cases always relapse on the first opportunity.

(3) It has been my observation that total and definite withdrawal is the best policy. A drug addict suffers slightly if any more from total withdrawal than he does from a marked or gradual reduction; hence, why prolong the agony? I have observed many cases taking as much as sixty grains daily with abrupt, total withdrawal suffering no more than those taking a smaller allowance and this allowance reduced. The patient's physical condition is carefully observed, ignoring his complaints and feelings, except by possible placebos, sterile water hypodermics, and so on, and in the event there is any physical indication in pulse or otherwise, one hypodermic of one-fourth grain of morphine is usually sufficient, seldom to be repeated. As a rule, within a few days after total withdrawal the patient begins sleeping, appetite returns and the course is upward in gain or weight and rapid improvement. Nearly all of the many physical ailments and complaints of the addict rapidly improve with discontinuing the opiates. The beginning of any treatment, of course, should be a complete physical examination in order to know all about the patient's body, as well as his mind and his history.

(4) I agree with the essayist fully as to time's being an important factor in treatment. Short-time treatments merely leave the patient physically able and mentally inclined toward a drug debauch on the first opportunity. Close and careful supervision, with physical and mental occupation, diversion and entertainment, are as necessary in these cases as in other psychiatric conditions. The habitué is usually primarily a weak person and is in addition psychotic from the excessive use of drugs. It takes time gradually to rebuild such a one by physical occupation primarily and mental diversion, encouragement, and assistance in planning for the future, thus stimulating a hopeful outlook. Altogether, treatment of drug addiction is a rather discouraging attempt at rehabilitation on account of the unfavorable hereditary or otherwise inherent personality constitutional deficiency background from which such a large percentage come, but it is worth the effort if only a few permanently recover, and others may be segregated for the protection against themselves and relief to society. Dr. Kolb and his associates deserve the congratulations of the American people for pioneering and leading the way in methods and plans for handling a troublesome social and medical problem.

Dr. Raymond S. Crispell, Durham, N. C.—Dr. Kolb has a unique opportunity and set-up to handle problems of drug addiction. To most of us practicing neuropsychiatry, in general hospitals, the addict is only a general problem, and is so bothersome and unsatisfactory to handle that each case strikes us very forcibly; in fact, one case has the force of ten, and I expect it seems to most of us that there must be a million cases in the United States instead of one per thousand population. We limit the discussion because Dr. Kolb does not make this a medical problem solely. It is really psychologic and sociologic. Who else but the psychiatrist could be interested in that? It is our distinction according to other medical men. He intimated that there is no specific. That is what we have all been looking for, some specific, some sort of chemical which would take the place of the drug to which they had been addicted and which could suddenly cure them. All of us remember "noxine" and several other drugs. We have gone through all that promised to be a specific and it is interesting to learn from Dr. Kolb, who speaks with experience and authority, that there is no specific.

He ties up the problem of addiction with constitutional psychopathic inferiority, and as his work warrants, with problems of criminology. These constitutional psychopathic inferiors and criminals, wards of the Federal Government, apparently have better facilities than the mental wards of Kentucky, as we have heard in these sessions, and certainly much better than the facilities of law-abiding mentally sick citizens of North Carolina. We approve of the Federal project, but are somewhat envious. As a matter of fact, I should like to know the daily cost of this particular institution for these wards of the Government.

Dr. Kolb emphasized the time element. I think that is very important, because it means that something

fundamental can be done rather than a rather patchwork of first aid. At Duke Hospital facilities do not even start to approach those of Dr. Kolb, and therefore we do not take an addict unless we are almost forced to do it, because we know we cannot keep him long enough to do anything fundamental, and I think that is a good point for a good many people to know. Unless they have facilities somewhat approaching Dr. Kolb's, and unless they have this time element, it would be better for the reputation of the psychiatrist and that of the hospital with which he is connected not to start to do anything at all.

The addicts are only one class, and only a small proportion of a class of people chronically maladjusted to society. It seems to me that psychiatrists should become a little more realistic and should consider society as well as the individual in proffering solutions to some of these pressing social problems. I was interested to hear Dr. Kolb say that the teeth and gums are very poor in these people, because I have just finished an interesting book, written by the Professor of Anthropology at Harvard, "Apes, Men and Morons," and he says it is the teeth, gums and jaw which give the signs of degeneration, and which will get all of us.

I could not get, either from reading Dr. Kolb's paper or from hearing it, the distinction between the two classes of psychopathic diathesis and constitutional psychopathic inferiority without psychoses. I do not doubt that he has excellent criteria with which he can make a differentiation. I could not at the present moment, and I suppose some of you are confused on that point, too. In a book that came out by Adams, put out by the Oxford Press, on "Drug Addiction," the classification given is much simpler. Adams describes two so-called normal addicts, the stabilized addict, one who keeps a small dose and does not increase that dose, and who goes along for periods of time without any serious signs of maladjustment, and the other normal one, which he calls the accidentally addicted person. The third is the natural addict and the fourth is the criminal addict. Dr. Kolb did not emphasize this point either in his paper nor has he in private conversation. He has emphasized the point that there may be such a thing as the criminal addict.

Dr. Kolb says they are weak rather than vicious, and need supervision rather than repression or restraint. Adams said there is such a thing as the criminal addict, and that addiction may begin as a vice, although he agrees it ends as a disease, as Dr. Kolb pointed out. I was extremely interested in the statement of Dr. Kolb that under his observation no case of psychosis caused primarily and predominantly by opiates had occurred. Dr. Kolb apparently has created an environment there that is extremely favorable. He must have trouble getting proper attendants who will be angelic in the face of these addicts, because they tantalize all of us who have a chance to deal with them. Dr. Kolb is very fortunate apparently in the accumulation of attendants with angelic disposition who can follow out the point of view he wants. If the point of view he has could be put across to wardens and others in hospitals, wardens in jails and jailers, it would help him in the problem of criminal psychiatry.

I was very much interested in reading the paper and hearing it to learn that Dr. Kolb apparently has more control over probationers than over actually sentenced inmates or patients. That is rather odd, is it not, and certainly he seems to have much more control over the patients than over a voluntary inmate or prisoner. He hints the law stands in his way and I can believe it does. He should secure the aid of physicians and have the law changed. We might as well have more good ones. If the Federal Government is going to have institutions of this type, let's have laws committing to institutions of this type, with adequate voluntary commitments whereby if the patient did commit himself voluntarily it would be understood the commitment was for a year and then the Federal courts or whatever courts they are, could not come in and interfere.

Dr. Kolb impresses us a great deal with his experience and authority and his common sense viewpoint that treatment rather than punishment is necessary, and that withdrawal is comparatively a simple matter. There is nothing specific in the withdrawal to eradicate totally the craving for the drug, but the necessary thing is for somebody to have an understanding of these unfortunates to bring about the necessary and important rehabilitation.

Dr. Titus H. Harris, Galveston, Tex.—Many patients develop a psychosis as a result of withdrawal or at the time of withdrawal or following withdrawal. I have had that experience with two or three. I do not understand it and, from Dr. Kolb's vast experience I should like to know if he has met with that problem.

Dr. Kolb (closing).—I want to thank the discussants for their very favorable remarks about our work. I fully agree with Dr. Crispell that drug addiction is just a phase in the history of these psychopathic personalities or unstable individuals, and I understand Dr. Crispell's confusion about the difference between psychopathic diasthesis and constitutional psychopathic inferiority. I am confused about it myself. It is merely, as far as we understand it, a different phase, or rather a different degree, of the same thing. The whole thing, of course, of psychopathic personality is more or less vague. It is a classification we put everything in when we do not know where else to put it. A mild degree of psychopathic personality, I described in another paper, as being recruited from among people who as children had various problems, and had somewhat of an open make-up and got into trouble with drugs and became addicted. They do not have a very severe degree of psychopathic deviation. It is really a question of degree.

As to the question of the cost of the institution, last year it cost us $1.80 per day for the treatment of these individuals. That, of course, compares, as Dr. Crispell intimated, quite favorably with the State of Kentucky. The first hospital west of the Alleghanies is situated in Lexington, Eastern State Hospital, and I was told by the Superintendent that the total cost of treating patients in that institution was about 53 cents: that includes salaries, food, clothes, etc. From that standpoint we have a palatial institution, but not too much to treat patients adequately.

We do have more control over the probationers. A provision was put in the law whereby judges could put a convicted patient on probation rather than give him a sentence, the condition being that he come to us for treatment and then we have complete authority to let him go as we choose. A sentenced Federal prisoner, after he has served one-half of his time, is eligible for parole. We can recommend him for parole or not. After he has served two-thirds of his term he is eligible for conditional release: he may go out if he behaves.

We should much prefer to have probationers because, as I said, in prisoners sentence is not a measure of the rehabilitation of drug addicts. We think it is harmful and hope the courts will be educated to the fact that drug addiction is only a phase in mental hygiene, not the criminal thing a person can do or become.

As to psychoses developing in cases in connection with withdrawal, we have not seen any permanent psychoses develop. I have seen two psychoses develop, not at Lexington, in my long experience with addicts, that lasted over a period of months, but during the actual withdrawal period we do occasionally have a person who appears to be psychotic for several days, and have had several suicidal attempts during withdrawal. A case that I recall was psychotic. I thought he was, others disagreed, and under withdrawal he locked himself in a room, got under the bed and tried to set the bed afire; he became somewhat negativistic and stayed in that condition about a week. I considered it a psychotic episode, but while others agreed, some said he was merely malingering so that we would give him more opium, which we did. The experience we had in that case and half a dozen more indicates that there is a short period, three, four or five days, where a person may have a mild psychotic episode, in some cases a depressive phase, where he may attempt suicide.

On the resumption of treatment these patients became decidedly hypomanic, almost a manic phase, and immediately upon the resumption of narcotics they may become adjusted again and calm down, but they were in a hypomanic state, a definite psychosis, for two months in one case, three in another.

EDUCATIONAL VALUE OF A PSYCHIATRIC DIVISION IN A GENERAL HOSPITAL*

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In a previous paper[1] we have discussed in detail the many advantages which result from the incorporation of a psychiatric division in the general hospital scheme. Consideration was given to the relative increase in the occurrence of mental disorders which have caused an overcrowding of state mental hospitals. For years there has been a tendency toward overbuilding of general hospitals, and it was pointed out how the creation of psychiatric units would utilize this excess bed space; thus additional provisions would be made to care for the increasing number of mental patients.

The psychiatric division of the John Sealy Hospital was created from a three-story building which formerly served as a nurses' residence. The division is in every respect a part of the general hospital; consequently the reduction of the overhead has made it possible for the hospital board to provide complete standard facilities and an excellent personnel for the patients' care. All of the accepted methods of therapy are available, namely: an occupational therapy department with a trained therapist, a recreational therapist with four assistants, psychiatrically trained nurses and attendants, continuous tub baths, and other physical therapy equipment. From a financial standpoint, the unit has been of such practical value to the hospital that plans are under way at present for enlargement of the division by utilization of another recently vacated building.

Besides the usual advantages which exist for patients in any well-equipped psychiatric hospital, this unit has the laboratory and consultation facilities of the general hospital, and offers to patients the opportunity of receiving hospitalization away from the usual atmosphere of the isolated mental hospital. Patients have voluntarily accepted hospitalization with greater readiness and their later readjustment to the community has been made easier when it was known that the illness was treated in a general hospital. Although the patients' welfare is aided materially, this scheme perhaps serves its most useful purpose in improving the attitudes of physicians and nurses, as well as the public, toward psychiatric patients, and in general toward the whole question of psychiatry. The main asset arises from the proximity of psychiatry to the other divisions of the hospital, so that present day psychiatric principles are integrated with the diagnosis and treatment of all types of illness.

Prior to the period of 1914-1918, the supposed scarcity of suitable teaching material was blamed for the failure of the psychiatric department to materialize, or to assume a prominent role in the medical curriculum. A survey by W. W. Graves,[2] made in 1914, revealed that psychiatry was taught only in the senior year of all schools except two. If the school was not located in the vicinity of, or if it completely lacked access to, a mental hospital, the instruction in psychiatry

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

consisted of a lecture course given only in the fourth year. Yet the survey of sixty medical colleges, conducted by Ebaugh[3] in 1932 for the Division of Psychiatric Education of the National Committee for Mental Hygiene, showed that twenty-eight schools gave some instruction during the preclinical years; an additional twenty schools taught psychiatry in the junior and senior years; eleven schools only in the senior year; and one school ignored the subject altogether.

This growth in psychiatric teaching may be attributed to a number of factors, but one of the more important is the utilization of the general hospital for teaching purposes. Several psychopathic hospitals have been made available for medical schools, and a few state hospitals have been used for clinical instruction. However, the realization that the psychoses constituted but a very small percentage of the total number of patients in general practice, and that the psychoneuroses and milder forms of personality disorders are responsible for 30 to 65 per cent of the symptoms for which patients consult the general practitioner, caused attention to become focused upon the general hospital as the ideal place for teaching psychiatry.

The statements of Ebaugh[4] and Farrer[5] sound the keynote of psychiatric education:

"Psychiatry should be looked upon as one of the fundamentals of the basic training of every physician, and should not be taught as a specialty, but should be a major division of the general medical curriculum along with medicine, surgery, obstetrics and pediatrics;" for the object is "not to make them specialists in psychiatry but rather to train them in the habit of giving full consideration to the mental aspect of illness in general."

How can these tenets be put into practice under more favorable circumstances than those found in the general hospital, which is the training ground for the medical profession. Most psychiatric educators[3 6 7 8 10 11] advocate the use of the general hospital for teaching the profession how to evaluate the many factors, both physical and mental, which lead to illness.

Holmes[9] first showed the value of bedside instruction for teaching clinical medicine; thus making the general hospital the center for all clinical instruction. As the various departments and divisions are coordinated for the advantage of the patient, the student of medicine grows to look upon the diversified specialties as a united group working and functioning together to promote the patient's welfare. Every modern scientific instrument is at hand for diagnosing and treating any injury or illness that may occur, and the student finds everything conducive to the study of the patient in his entirety. With a psychiatric department functioning within this composite group, students will be conditioned to think of psychiatry as an integrated part of medicine.

This plan for teaching psychiatry may appear to limit the usefulness of regular mental hospitals, that is, the psychopathic hospitals and state institutions. However, this is not true, for these hospitals offer opportunities for intensive study and research into the mechanisms of mental disease. Consequently, physicians specializing in psychiatry find ideal conditions in which to pursue the study of mental mechanisms. For teaching medical students or nurses the outstanding drawback to these institutions is the absence of the milder forms of mental illness. A constructive criticism to psychiatric education, contained in the report of Dr. Ebaugh, concerned that tendency toward isolation which has always been prevalent in psychiatry. By making use of the material in the general hospital, both of these situations are corrected. Isolation has fostered many of the unhealthy ideas concerning mental disease which are prevalent today in medical and lay circles. The general attitude toward mental patients cannot be altered in a short period of time, but this may be partially eliminated by changing the patient from the unfamiliar atmosphere of the mental hospital to the well known environs of the general hospital.

The psychiatric unit of the John Sealy Hospital has been significant, not for furnishing material for teaching students, but from the position of providing instruction to the hospital staff and the physicians of the city, the resident intern staff, the nursing staff, and through serving as a center of influence in the community for creating an improved attitude toward mental disease.

Today, a psychiatric unit as a part of the general hospital is still a unique arrangement. The influence that it will wield in shaping psychiatric opinion has not been determined, but a unit devoted to the care of private patients will assist in changing some of the fixed attitudes of the medical profession and the laity. During the short time that the psychiatric division of the John Sealy Hospital has been in existence a no-

ticeable change has occurred in the viewpoint of the physicians of the city toward psychiatric patients. Any member of the County Medical Society may place patients in the unit. This is particularly advantageous for physicians where their patients, who are already in the general hospital, develop complicating toxic or organic mental reactions. The patient can be transferred to the psychiatric unit where provisions are always available for controlling the delirium, and the physician can continue treatment of the primary physical disorder.

With a place to hospitalize patients, the physician will take a greater interest in studying patients who are mentally ill, and will be inclined to develop a sympathetic understanding toward mental disease as a result of this opportunity to observe patients functioning in the hospital environment. These are not the only lessons for the physician. Contact occurs with other patients through consultations and by accidental encounters about the hospital grounds. With the passage of time the natural result of this contact will be a gradual appreciation of the nature of mental and nervous disorders, and the incidence of recovery about parallels the recovery rate of physical disorders. Then patients will be sent to the hospital in the early stages of their illness, when the greatest benefit will be derived from treatment. Many cases of chronic illness would be prevented and a number of patients kept from suicide by this early action of the physician.

With the attention being given to psychiatry in most medical schools today, future physicians should have a healthier attitude toward the mental patient than exists in the minds of the majority of the medical profession at the present time. Yet with the complete absence of a psychiatric service in most general hospital internships, interns are likely to lose sight of the important place occupied by psychiatry in general medicine. Consequently, every general internship would be vastly improved by including a service in psychiatry.

The psychiatric unit provides the general hospital intern with an opportunity to participate in the prescribed routine for treatment of mental patients. In addition, history taking and the study of patients' mental status and reactions to the environment, plus complete physical and laboratory studies, tend to imbue the intern with the custom of considering the patient from every standpoint. The close relationships between mind and body functions are thus emphasized, so that the intern leaves the service with a better understanding of the psychosomatic interrelationships and the part which emotional factors can play in the production of illness. The doctrine of integration receives further emphasis, since the intern rotates from medicine to psychiatry to surgery. Thus the chief precepts of psychiatric education are made possible. Later in practice that physician is prepared to deal not only with the psychoneurotic and other mild personality disorders, but the previous contact with major psychoses enables him to act promptly to secure the proper treatment for the patient.

Every psychiatrist is well aware of the difficulty in finding a suitable nurse to care for a mental patient. With the complete lack of training in psychiatry in most schools of nursing, the average nurse's attitude toward a psychiatric patient is the same as that of any non-medically trained individual. They are uninterested in accepting such cases, and will refuse to nurse mental patients unless forced to for economic reasons. Most of a nurse's training consists in practical experience with patients, so that it is impossible for her to get psychiatric information from didactic lectures and demonstrations. The general hospital psychiatric unit furnishes a means of the student nurse's obtaining experience in the nursing care of mental patients, and she is thus not only prepared to nurse mental patients but has a different attitude toward mental disease. Such experience teaches her, too, to have a more sympathetic attitude toward the complaints of the average medical or surgical patient. In other words, she has an opportunity to acquire a much needed psychiatric viewpoint.

Each student of the University of Texas School of Nursing spends two months in the psychiatric division of the hospital, and thus has practical experience with all kinds of mental patients in the same sense that she does with medical and surgical patients.

The unhealthy attitude of the public toward mental illness has been a factor in the slow development of psychiatry. Mental hygienists have combated these ideas for the past twenty-five

years and progress has been made in creating a healthier attitude toward the whole problem of mental disease. The construction of psychopathic hospitals in proximity to general hospitals and medical schools has also been a step in this direction. However, we believe that the development of psychiatric units in the general hospital system will furnish a greater opportunity for the public to secure the proper information about mental illness.

The hospital arrangement previously described shows that a mentally sick individual is like any other sick person and can be treated in the same institution. Also the stigma attached to a mental hospital does not exist to as great a degree. This is shown by the larger percentage of psychoneurotic patients who voluntarily enter the psychiatric division. Patients will accept hospitalization earlier, as they realize that friends and relatives know they are receiving treatment in a general hospital.

We believe the psychiatric unit in the general hospital will play an important role in the future development of psychiatry. The division has demonstrated how psychiatry can be removed from a position of isolation into the united system of medicine. Undoubtedly, the attitude toward psychiatry in our community has improved as a result of the psychiatric unit in the John Sealy Hospital.

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John Sealy Hospital

HISTORY OF THE MENTAL HYGIENE MOVEMENT IN THE UNITED STATES*

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It is not possible to understand the development of the mental hygiene movement through knowing merely a few facts about the treatment of the mentally ill from decade to decade. The incidents in the care of the mentally ill are but symptoms of a society, sick, if you wish, but, from another standpoint, possibly conceived of as an immature but growing society; in any case, a society that is subject to progressive improvement. And so, in discussing the mental hygiene movement, I do not want to talk about incidents without considering them merely as evidences of the state of being of our culture.

If we follow the treatment of the mentally ill, we shall find that our curve of progress has had its ups and downs, but we are not disturbed by the intermittentcy of the progress as long as the general trend is inclined in the optimal direction. We know that with changing times there are changes of culture, and that almost without knowing it our handling of social problems may actually degenerate. We come to appreciate this lag only when old methods which we thought were sound, and which were sound under earlier conditions, begin to fail and demands for revolutionary changes occur. We are often apt to think of these needs for revolutionary changes as evidence that previously we have been on the wrong track rather than as evidence that we are working with changed conditions that make the old formulas no longer applicable. By the same token, we should not easily blame the past.

We have to start with the fact that mental disease until recently has been a concern not so much of science or medical practice as of people living with each other satisfactorily or unsatisfactorily, with prejudices and limited knowledge, and that the treatment of the mentally ill was determined by the general feelings of society rather than by experimentally validated scientific procedures. Dependent upon how people lived, the mentally ill would then be treated rev-

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

erently, with aversion, with fear, with levity or ridicule, or with scientific curiosity.

We can roughly classify our progress in the mental hygiene field into three periods: the period before 1800, the Nineteenth Century, and the early Twentieth Century.

In the beginning, we probably passed through a stage of indifference toward mental disease, a stage which is not historically recorded, but which is surmised from current studies of more primitive cultures. Historically, with the exception of a few bright spots, our consideration of the mentally ill prior to 1800 was largely mystical. During the Nineteenth Century, the attitude was primarily one of agnosticism and theorization. The Twentieth Century has been characterized by a scientific approach. It is, of course, true that indifference, mysticism and agnosticism are still to be found abundantly, since our cultural growth has not been uniform throughout our population. Old attitudes and the conditions that foster those attitudes hold fast. But the leadership and the popular following has been toward scientific understanding along the lines suggested above as characteristic of these three eras.

Why have these characteristic attitudes become established? How can there be indifference toward the mentally ill? Perhaps it can be understood as an expression of that particular cultural condition in which the struggle for life is a very individual affair, in which the patterns of organization of the cultural group are simple and more responsive to immediate conditions than to well-established group or enduring social patterns. Since individualism and social interdependence vary greatly in our present culture, it is to be expected that the intensity of concern about the mentally ill will vary.

How is it possible that mentally sick people could be, on the one hand, set up on a pedestal as enjoying some divine visitation, and, on the other hand, cast down to the depths as envoys of the devil, or unfortunates whose bodies had been seized by the devil or rented by him for a price? It is not the worship of the psychotic nor his torture and exorcism that concerns us, because these are logical conclusions growing out of the major premise of divine visits or demoniacal possession. We are much more concerned that in some cultures the predominating mystical or religious custom or pattern has come from a leader whose powers are derived from trances and visions very much like those of dementia precox. It is not surprising that the dementia precox patient is thus revered. The schizophrenic speaks as if his actions are controlled by some outside influence interpreted by himself as divine, demoniacal, or hypnosis, radio, electricity, astigmatism, or technology, and even today cults are founded on these utterances of such mentally sick persons.

We are also interested in seeing how a belief in demoniacal possession in the form of witchcraft grew out of a puritan culture that had been thrown into a frontier of the Massachusetts woods: struggling at first to maintain and express its original philosophies in pure form, but weakening in the face of harsh realities of the frontier, successively expressing its righteousness not through positive actions of its own, but through persecuting those who believe differently and finally resorting to punishment for witchcraft. The lack of restraint of the speech and actions of the psychotic are a disagreeable reminder, especially to the righteous who have struggled to suppress some of their so-called baser inclinations. The psychotic thus evokes an emotional protest very much as we have been experiencing it throughout the country during the past year in reactions to so-called sex crimes. That the sex criminal is expressing in an exaggerated way a thing that is in most of us is evidenced by the sales value of suggestive pictures in some of our tabloids and the burlesque shows that cater to this element. We protest against it by a demand that the sex offender be punished rather than treated as an invalid.

When we consider that prior to 1800 medical practice in America was at a very low level even compared to the best at the time in Europe, there was not much to counteract some of these mystical interpretations. The treatment of the mentally ill is a corollary of the way people treat each other and the mysteries with which they are surrounded. With death and disease prevalent, they had to develop a callousness toward hardships that carried over into all human relationships. Life held less for people. People died easily, were dirty, and infested with all sorts of parasites. The demand for spiritual leadership was possibly even greater than it is now, because its vitalizing influence was more constantly needed as an antidote for some of the realities, and mystical interpretations that escaped realities found fertile soil. As a present day counterpart, anti-vivisection is kept alive, not so much by a concern for the life or feelings of the guinea pig, but by man's fear of his own barbarism, which, unless stopped at the animal stage, may fall on himself and become destruc-

tive. In becoming mechanized, humane societies have lost much of that potential value.

Introducing the dominant attitude of the Nineteenth Century, that of agnosticism, were two important gains: on the one hand, we were gradually able to see the mentally ill as persons in need of special treatment. For this purpose, special asylums, or hospitals, were established for their care. In other words, we had arrived at a point where we neither revered nor hated them, but protected them. Second, we had arrived at a point where we were able to laugh at and ridicule the crazy. While it may seem pretty terrible to us now to think back to a time when the mentally ill were exhibited publicly for a small admission fee, we perhaps can understand that it required a tremendous advance to arrive at a point of sufficient security that would allow us to see something humorous in the psychotic person rather than an evil eye or a divine visitation before which to bow down. We were at least enabled to inspect critically and to develop a fund of observations about these patients. The stage of ridicule was a step toward a calmer attitude. People are not generally amused by things by which they are not a little upset. Laughter is elicited when we feel, on the one hand, sufficiently close to the threat, and, on the other, sufficiently safe from the threat to appreciate our advantage. Probably every psychiatrist early in his career passed through a stage when he was more amused by the psychotic than he is today. The maxim "He who laughs last laughs best" implies that he who laughs first may be not too far from the situation in which he will later be laughed at, and thus this ability to laugh at the insane in the early Nineteenth Century reflected the more serious attitude of the earlier period, a "whistling in the dark" introducing a period of greater calm when scientific steps could be taken.

Further expressive of the agnosticism of the Nineteenth Century is the term "crazy." This word and its meaning are both related to the term "crazed" as applied to the irregular cracking in the glaze of pottery. It was an achievement to be able to admit that the actions of the psychotic defied our fund of knowledge instead of depending upon a pseudo-explanation in mystical terms.

The term "crazy" carried with it a humility which said, "We do not know," "We cannot explain," a humility that was a necessary prelude to scientific understanding. The Nineteenth Century experienced many attempts to theorize and to get away from this ignorance. The theories themselves were often really mystical interpretations in the disguise of more modern physiology. Bodily humors differed from demons only in the way they followed this physiological pattern.

The Nineteenth Century began with and ended with missionary efforts, which were sometimes merely a protest against ignorance and sometimes an enlightened viewpoint for whose permanent reception our culture had not yet developed sufficiently. Rush, in Philadelphia, definitely reflected a tendency in Europe to do away with harsher treatment of the insane and to bring out the point that relatively few psychotics are actually dangerous. Our culture was hardly ripe for this viewpoint; we were able to absorb a little, but, with the weakening of leadership, there was a decline to harsher, cheaper methods of dealing with the mentally ill. A missionary is apt to succeed in so far as he hastens a trend. Rush was ahead of his time and our culture could absorb only a small amount of his contribution, so that along in the middle of the century came Dorothea Dix, bringing patients out of jails and poorhouses and bringing hospitals and better equipment out of reluctant legislators. The part played by the South in this whole hospital movement is one of which it may be justly proud. Williamsburg, Virginia, in 1773, was the pioneer; Kentucky and South Carolina, in 1822 and 1828, were among the early states to make such provision.

Ushering out the Nineteenth Century was a third missionary, Clifford Beers, who found the culture of his day ripe for his contribution. Rush was a physician, Dorothea Dix a teacher; Beers was a patient and had no professional equipment at all, and it might be assumed that his efforts would be less tempered by conservatism and sound critique than were those of the others. Perhaps in 1800 they would have been, but a century later his approach was quite different. He provided to the leaders who had achieved the soundest scientific foundation for their psychiatry, ambition, energy, and a free envoy for a cause that gave power as well as validity to the high points of psychiatric progress. He fostered the general principle of providing the best treatment that science could devise, but left it to science to define the details of that treatment. The results of his efforts are so inextricably bound up with the achievements of the Twentieth Century, to which they led directly, and into which they have continued, that it is impossible to go into detail without falling short of a complete recitation. There is every

evidence that this third missionary effort of the Nineteenth Century period will experience a lesser relapse than did the two preceding.

It is a paradox that out of sincere, even if erroneous, efforts and theories often comes a knowledge of truth that would not have come from an over-critical truth seeking alone. Out of the transient theories of the Nineteenth Century and the novel forms of diagnostic classification, the strange forms of treatment, and swings of extravagantly gloomy or sanguine prognosis, have come orientations that have led to scientific truths. This could have been possible, however, only when a sincerity accompanied what may now seem to be very questionable claims and procedures. At one time very extravagant claims were made for the curability of mental disease. This had its advantages and its reactions, but it fostered a critique out of which we have made real gains. This paradox is but an instance of history's repeating itself, for Hippocrates evolved from a school of Aesculapian mysticism which had no semblance of science, and was not too sincerely ethical.

We perhaps should have a certain amount of humility in looking back upon and criticizing in the light of 1937 some of the things that took place in the earlier years, for the concepts that controlled them may not today be entirely clear. We can readily understand that the production of convulsions in dementia precox by insulin or metrazol in 1937 might fifty years from now, particularly if it proves not a permanent therapeutic procedure, be considered quite as cruel as were the tortures inflicted on patients two hundred years ago. Our rather abundant literature might save us from too harsh an interpretation.

Along with the growing science in the field of mental hygiene in the Nineteenth Century, there was also a growing definition of the legal status of the insane. America had something to contend with in defining this status because her own legal traditions were derived from many often conflicting sources. The legal status of the insane is related to two different elements: the question of criminal responsibility and the question of personal competence. In the first respect, we had to contend with all of our mixed traditions and feelings toward the criminal. At one time, we aim to get even with the criminal for what he has done; at another, we are interested in protecting the public and we deal with him purely from that standpoint; now we punish him to impress or deter others who may be likely to commit crime; and now we provide treatment and a new life for him that will result in reformation. The insane have been thought of as eligible for some mitigation of retributive punishment because of their lack of responsibility. As soon, however, as we try to treat the criminal for his defects, we shall be saved some of the embarrassments of determining responsibility. It is because we are in the more retributive stage of dealing with the criminal that safeguards have had to be set up to protect the mentally sick. Our state laws dealing with the insane are today a mixture running the full range of these attitudes toward the criminal. On the one hand, he is forced to plead guilty or not guilty, and tried before a jury. At the other extreme, he is given consideration by a group of medical experts.

In determining his competence, the mentally sick person likewise has had his position more clearly defined and provisions have been set up for his protection both from his own symptoms and from the maladministration of his affairs by others, but all too frequently the legal procedures for defining his status have been copied from the criminal approach.

The Twentieth Century has been concerned much more with the treatment of the psychotic patient than with his administration. The coming of Beers along with the flood tide has made it possible to reach a higher level than would have been reached otherwise. It is significant that in spite of our size we in the United States know what is going on in various parts of our country better than do European nations, and this constant interchange and cross-fertilization which have grown out of Beers' work have been an important influence in advancing scientific psychiatry. There are several elements in this up-tide that warrant attention. First, it was Kraepelin who organized the data obtained from observation of psychotics into a classification and thus largely eliminated the necessity any longer to consider them crazy. So well did he do this that the time came when the attractiveness of his classification preoccupied us to a point where it was difficult to find a place for treatment or to recognize that his types were not all distinct diseases. To Adolf Meyer must be credited the placing of the examination of a patient on a basis that produced well-rounded and reliable data and giving us an appreciation of the psychiatric symptom as an effect that has grown out of diverse causes, whether neurological or social. Freud turned the microscope on certain important causes of mental disorder and provided a well-defined therapeutic proce-

dure. Although there are those who regret the narrowness of some psychoanalytic concepts and procedures, psychoanalysis has grown, mellowed, and contributed immensely to our appreciation of the subtleties of human motivation. We now have a variety of fairly well-formulated therapeutic approaches.

The psychopathic hospital, which characterized the opening of the Twentieth Century, has performed a distinct service by putting the state hospital to shame. The psychopathic hospital also has found some very worthy progeny in the establishment of special services in connection with our state hospitals and in clarifying the need for psychiatric wards in our general hospitals. It no longer has a monopoly over research and it has validated the century-old fight for the removal of restraint by showing that adequate personnel makes restraint unnecessary.

The Twentieth Century has seen some weakening of what we may call the Principality of the State Hospital. We can understand how the state hospital has become a little principality if we appreciate its origin. It represents the ultimate response of a community to a serious irritation. Communities, as a rule, equip themselves for action only as the irritant becomes unbearable and then they equip themselves only with the minimum requirements. The poorhouse and the jail were the first equipment. It had the advantage of being close to the community and keeping the problem of mental disease close to the community so that it could not be lost sight of, but its service was crude. In order to get the advantages of better staff and facilities, cooperation with other communities under state auspices was set up in the form of a state hospital, but these hospitals were detached from their communities and became very isolated, having little connection with the conditions from which their patients came and the conditions to which patients returned. This isolation has been comfortable and has afforded security to the staff and simplified the definition of scope, but the state hospital now is seen to have a responsibility for the mental health of its community, and an effort is being made to break down its isolation in order that it may perform this service. Coordination of state institutions and the provision of extramural services are the two important aspects of this movement, but some of the rulers in these principalities see a life of ease interfered with by this movement and resist it very much.

The Twentieth Century has also seen the beginnings of prevention, particularly in the form of the child guidance clinic. While we are perhaps as justified in speaking of prevention as we are of treatment, in view of our present scientific resources, we nevertheless have to realize that a preventive program is in a position to make no promises. It uses the best and most logical facilities and knowledge today available. Out of this use there will come further progress, eventuating in what would be provable prevention. Without the present effort, there will be no progress.

It may be concluded that today the forefronts of mental hygiene are intensely interested in the prevention of mental disease, on the one hand, through clinical services to those whose problems are in the making, and, on the other hand, along public health lines, through influencing the cultural conditions to which people are subjected. Mental hygiene is acting as a pathway to bridge the gaps between medicine, social work, education, public health, the court, and the church. The forefront of each of these fields is very much concerned with the understanding of individual problems and is advancing in the direction of psychiatry, which it may be expected to meet at some intermediate point, as psychiatry is more and more appreciating these other agents in conserving mental health. These services represent the community, as it really means something to its people, and as these agencies act jointly, they reflect the fact that education, health, welfare, and religion are but artificial divisions of labor and not really separable without violating the unity of a person. This progress of various community agencies is putting a demand on state hospitals that will force them to open their doors if they are not progressive enough to see for themselves where their opportunities lie. The advances in psychiatric education are going to do something about this also, because physicians are graduating today with a much better appreciation of what psychiatry can offer and will have something to say about what will be demanded of state hospitals.

It may be fairly safely predicted that in a few years the laggard hospital will no longer be able to get along on the chance of getting a good young man and keeping him permanently. The man interested in entering psychiatry will be guided to the places that will really offer him something, and the status of the laggard hospital will probably become intolerable. We may look forward, also, to the acceptance of the principle that (1) the housing of the mentally ill in asylums, (2) their treatment in hospitals, and (3) their prevention through clinics and improved

environment are all three insufficient. The people who are not mentally ill are more and more demanding that their lives be enriched by the knowledge that we have gained from understanding of those who are sick. The family physician and the school teacher will probably be the chief instruments of this fourth level of mental hygiene service.

CAN STUDENT FAILURES BE REDUCED?*

By W. T. SANGER, M.A., PH.D., LL.D.†
Richmond, Virginia

A young man enters the medical school. He has never wanted to do anything else. Through high school and college his efforts have been directed to the careful preparation for the study of medicine. He was admitted to the medical school in the belief that he was qualified and he has given his undivided attention to his studies throughout the year. Notwithstanding this careful preparation and application, he is asked to withdraw at the close of the session because of unsatisfactory work.

This outcome is a shock to him personally, to his family and to his friends and neighbors, who knew of his desire to qualify for medical practice. The net result may be cumulative, even a serious blow, perhaps of irreparable character, to the failing student.

This little episode is commonplace in the routine of medical schools. From 10 to 50 per cent of the students who enter never graduate. It would, doubtless, be impressive if the effect upon personality and character in subsequent careers of the failing students could be thrown upon a screen for analysis.

Certainly, no one wishes an individual to go on in medical studies, graduate and enter upon the practice of medicine unless personally and professionally qualified; yet, some doubt remains as to whether we, in medical education, have adopted every possible expedient to reduce failures.

Evidently, the answer does not lie merely in the selection of students. Our technic of selection is imperfect; its administration is imperfect. It will always be so. No technic dealing with human beings is better than the procedure in applying it, and here the human factor enters again. Certainly, it is desirable to improve the procedure in student selection in every way possible, but it is believed that other expedients may probably be employed to reduce student failures.

Some suggestions for reducing student failures will be offered in the spirit of the experimentalist for discussion and, perchance, for application in the same spirit.

At the Medical College of Virginia, Richmond, first year students in both the schools of medicine and dentistry were asked to report two weeks earlier than upper classmen last fall. This extra time was not used as a typical orientation period as now common with first year undergraduate college students. The regular class schedule operated. The volume of work assigned daily at first was somewhat less than has been assigned to freshmen in previous years. As the medical school expects a volume of work and a degree of accuracy considerably greater for a given period than is required of premedical students, it was thought that beginning the year with a slower tempo would enable students to catch in time the accelerated stride expected of them more certainly. This seems to be the case.

To be sure, there are yet no definite results from this experiment; there is even no assurance that it will be continued indefinitely. However, there is the impression that this expedient may have value and should be continued to ascertain over an ample period whether this is true.

Another suggestion has been made by our Professor of Anatomy that a larger group of students be admitted to the first year class, be required to report two or three weeks early, with the expectation that at the end of, say, six or eight weeks, the class to be carried through the year be chosen. This might eliminate a considerable number of students, but would have the effect of turning them back in time to enter upon some other course of study during the same year or upon some type of worthwhile employment. On this basis, the matriculation of students would be tentative and the sense of failure which is really a terrific blow to some types of personality, would be considerably mollified. Of course, it could be objected that some of the students turned back might ultimately have qualified to go on with the study of medicine. At any rate, it might be interesting to make an experiment of this sort.

The student, everyone will agree, is not the

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*Read in Section on Medical Education, Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

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only factor in failures. Poor teaching makes its contribution and this should not be belittled. Better teaching is a constant objective, or ought to be, in most schools. Emphasis upon better teaching, beginning first in the lower grades and spreading to high school and college, might well have more consideration in professional schools. In-service training of medical school teachers is doubtless as important as the in-service training of any other teachers. The college of education is generally more willing to make a contribution here than teachers in service are willing to accept it. Nevertheless, that does not rule out these possibilities.

Some solutions for student failures may lie in emphasizing in proper ways and on repeated occasions with the various college associations that on the whole medical students are required to carry a larger volume of work with a higher degree of accuracy than the students of liberal arts colleges, generally speaking. Many liberal arts faculties hardly realize what is expected of students in medical schools. Reporting to the liberal arts colleges the records of their students in medicine has some indirect value in this connection, but frank discussion with the deans and faculties of liberal arts colleges, or their representatives, during college association meetings, is likely to be more directly effective.

It has been suggested that the preparation for medicine be shortened by a year and the medical course lengthened by a year, the first year of the five-year medical course to include the completion of premedical preparation and the beginning of medical study. During this period it is argued that the proper transition from college to medical school could be made to the advantage of all concerned. Thus, the stride could be stepped up, the student broken into the new work, the fear of failure which bulks large with certain students be kept down, and a very happy and successful year carried out.

The fear of failure on the part of a considerable number of students may be a dominant factor in the failure of some of these students. We may lose some potential leaders to the profession by this circumstance. Fear is devastating to some types of individuals, which suggests the wisdom of allaying the fear complex whenever possible. Proper faculty-student relationship may contribute enormously to this end. Certainly, there is no place for announcement at the beginning of any course of the number of students who failed in that course the year before. However, this seems not to be an uncommon occurrence.

By emphasizing and at times exaggerating the difficulties and the hardships of progress through the medical course, upper classmen play a considerable role in developing the fear complex among students of the lower classes. Sometimes it appears that the magnitude of this role takes the form of mental hazing. This is not an easy situation to deal with. It can be counteracted in part by a proper stand on the part of the faculty.

Better students and better teaching would be the simple answer to the reduction of failures, but how are such students to be found and how is better teaching to be achieved? Better is a relative term. One student may be better in one set of circumstances and another student in different circumstances. Teaching of a given kind for one student may be better; it may not be for another student. Clearly, the reduction of student failure is a complex issue. This suggests continual study and experimentation. The pedagogical sin lies in ignoring the issue on the assumption that the trouble lies solely with the student, that the school has no responsibility in the matter.

Any curriculum like medicine which is largely prescribed cannot take into account to an ample degree the full import of individual differences; it is too much to assume that each student should do approximately as well in each course of any year's study. As a matter of fact, human nature is not built on this pattern; it is really too much to expect that a student will do quite as well in chemistry as in anatomy or vice versa. In dealing with students one is impressed with a need of keeping constantly in mind the principle of individual differences; otherwise, injustices will surely be committed.

At present social intelligence, perhaps as important as mental brightness to medical practitioners, is subject to no special measuring technic. In the future, however, it is reasonable to believe that social intelligence will have large consideration in the admission of students and, therefore, claim equal consideration in dealing with student failures.

No attempts have been made to compute the financial loss either to the individuals concerned or to their colleges on account of student failures. It would be difficult to segregate preventable from inevitable failures. The effort here has been rather to state the problem and to express the belief that something can be done to solve it in part; that to this end the school session may be lengthened for first year students; that such

students may be matriculated tentatively at the beginning of the year and the class to go through the session be selected after six or eight weeks; that steps be taken to improve the quality of the teaching; that liberal arts colleges be advised of the greater volume of work and accuracy required in medical schools in the hope that students entering for medicine may be better prepared; that the preparation for medicine might be shortened by a year and the medical course lengthened by a year, the first year of the medical course to be regarded as transitional, in which preparation for medicine would be completed and its study begun; that the student be protected against the fear complex; that merely aiming at better students and better teaching, ends desirable in themselves, will not meet the issue as completely as is desired; and finally, that the *laissez faire* policy in this connection leads nowhere; something definitely constructive must be ever pursued, always with an experimental attitude.

DISCUSSION (*Abstract*)

Dr. B. I. Burns, New Orleans, La.—Dr. Sanger's paper deals with one of the most baffling questions presented to medical faculties. Student failures should be reduced and doubtless can be, but it seems evident that the solution of the problem involves many factors.

It has often been said that a small group of students in a typical class will do satisfactory work regardless of teaching methods and course organization; another small group will fail regardless of what is attempted for them in the way of help; and that teaching problems should consider only the large middle group who need and will profit by instruction. The fallacies in such a viewpoint are obvious. However, it is true that ten to twenty per cent of students comprising the average first year medical class do fail and that fact indicates a corresponding waste of facilities provided for medical education.

There is no "cure-all" but, to anyone who has devoted a number of years to teaching medical students, two defects in the machinery should be apparent. The first of these lies in poor preparation for the study of medicine. We hear a great deal said about just what should be the premedical course content. With the exception of certain basic training in chemistry I believe the subject matter of premedical courses offered is of far less importance than the manner in which the job is done. Our general arts and science course of study, including the so-called premedical, is not exacting. Probably too many students pass it. Certainly most of the students who fail medicine demonstrate conclusively that they have had no worthwhile preparatory training They have acquired lit*le information and practically no knowledge. They fail because they have no notion of how to study.

The second defect in the educational machinery is in the medical program itself. We have a "Topsy" curriculum in which fairly well isolated departments try to overstuff the student's brain-box with information, some of which is worth while, but much of which is of doubtful value. We make practically no attempt at integration of the various courses offered and we should be well satisfied with results if we succeed in even getting students to wonder what it is all about. As teachers we attempt to know a great deal about one limited field and expect the student to know too much. Each department hands him a piece of a jig-saw puzzle and he is expected to put it together, a laudable exercise, perhaps, if the makers of the pieces had seen to it that the pieces would fit.

Dr. Sanger (closing).—Course placement as emphasized by the dean of the Vanderbilt Medical School is in my judgment an important factor in reducing student failures. I quite agree with those who have emphasized the significance of cordial personal relations between students and faculty. The plan of the Vanderbilt dean to have students for dinner in small groups is indeed commendable. By working together thoughtfully, I believe student failures can be materially reduced.

SYMPOSIUM ON MALARIA—Part 2‡

REVIEW OF RECENT RESEARCH ON MEDICAL PROPHYLAXIS AND TREATMENT OF MALARIA*

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This is a member's report to the Chairman of the Sub-Committee on Medical Research of the National Malaria Committee. As is always the case each year, there is so great a volume of published reports that it is impossible to mention them all in this review. I, therefore, exercise the privilege of selecting a few of the available representative reports from different nations where malaria is a great problem. Any member desiring more information can find the large majority of the important reports for the year in the records of the League of Nations Malaria Commission and in the *Tropical Diseases Bulletin.*

Quinine is still our chief drug for malaria due to supply, cost and safety of administration in the field. I shall give it only brief space because I feel sure the Committee desires reference to the synthetic drugs and other new features presented during the year. It is interesting to note that five reports[1] are on record concerning information on the cultivation of cinchona by the East African Agricultural Station of Amani, Tanganyika Territory.

Sinton,[2] writing on the standardization of mixed preparations of the cinchona alkaloids in relation to Indian conditions, claims that such preparations seem eminently suitable for mass treatment among malarious populations who cannot afford more expensive drugs and who cannot easily obtain medical advice. Dunn[3] considers quinine the only safe remedy for the mass treatment of malaria. Quinine combined with plasmochin in non-toxic doses for short periods is, however, recommended with a view to reducing the relapse rate and attacking the sexual phase of the parasite of malignant tertian fever when it is present. Dunn gives 22½ grains of quinine daily for seven days. "Atebrin" is considered unsuitable for mass distribution.

Fabry[5] considers that quinine and "atebrin" have equal value in the treatment of an acute attack of benign tertian malaria infection, but in severe malignant tertian infections, such as are met with in Indo-China, "atebrin" is definitely superior to quinine. The human organism itself and time are the most important factors in recovery and every care should be taken not to damage the former.

Wallace,[6] in a Malayan report, used mass treatment with "atebrin" as the sole measure of malaria control employed since 1933. For five successive days 2 tablets of "atebrin" were given at the morning muster to each adult. In the afternoon, one more tablet of "atebrin" and one tablet of plasmochin simplex (0.01 gram) were given. One tablet of plasmochin simplex was given alone on the sixth and the seventh days. After this initial intensive treatment a "follow-up" treatment of a weekly dose of three or four tablets of "atebrin" on one or on two days a week was started. This was continued for as long as four months. The rate was practically nil. Many thousands of coolies were treated and no serious toxic effects were noted.

Ziemann,[7] in discussing war malaria and its results, recommends "atebrin" either 0.05 gram daily or 0.2 gram twice weekly. For permanently clearing a malarial area 0.02 gram plasmochin twice weekly is recommended to prevent development of gametes in the mosquito. Bispham[8] will read before our society this fall (1937) his final report on the use of "atebrin" in the prophylaxis and treatment of malaria. His investigations were carried out among civilian conservation corps enrollees in the Fourth Corps area during the last three years. He believes that "atebrin" has furnished a solution to the problem of prophylaxis and treatment of malaria as far as infection with *P. vivax* is concerned, but it should not be concluded that "atebrin" is put forward as a drug which eliminates malarial infection as water does fire. He thinks that 90 per cent of the carriers of *P. vivax* can be cleared of all parasites. He feels that his experience has

"clearly proven that when used as a prophylactic, under supervision, men of susceptible age can live and carry on their various occupations in a highly infected area with a minimum of malarial infection and a maximum of effectiveness."

Untoward actions of the drug were almost never encountered and when encountered were of a transient character.

Rao[9] claims that mass treatment and prophylaxis with "atebrin" gave good results, but the cost of the program made it impossible to carry on.

Ruge[10] regards "atebrin" as a distinct advance over quinine. For successful prophylaxis, it need be given only twice weekly in doses of 0.1 gram. In badly infected areas it may be combined with 0.01 gram plasmochin twice weekly. It is not yet definitely determined that these two drugs are causal prophylactics. The prophylactic treatment should be started one week

*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

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‡The Symposium on Malaria, papers from the National Malaria Committee (Conference on Malaria), meeting conjointly with the Southern Medical Association at New Orleans, Louisiana, November 30--December 1-2-3, 1937, which are to be published in the SOUTHERN MEDICAL JOURNAL, appears in two parts: Part 1 in the July issue and Part 2 in this issue.

before entering the malarial area in order that the drug may reach a certain level in the blood, which prevents the sporozoites from entering the reticulo-endothelial system.

Mezincesco[11] finds that "atebrin" and quinine act equally well for prophylactic treatment, but there were many relapses and skin staining was a disadvantage when "atebrin" was used. Transmission occurred during the period of prophylactic treatment.

Amy and Boyd[12] made a study of troops in India, the average strength approximating 55,000. A detailed report is given from 1919 to 1935. They recommend the following standard treatment for troops in India: The patient is put to bed and purged with calomel, followed by epsom salts. Quinine is then given until initial febrile paroxysms are controlled. Quinine is then stopped and "atebrin" is given, 0.3 gram a day for 7 days. The patient is then allowed to get up and receive 0.03 gram of plasmochin a day for a further 5 days. They report fewer cases of relapse where this scheme is used.

Van Henkelom[13] treated 119 cases of acute malaria by intramuscular injections of "atebrin." Another series of 100 cases were given quinine by mouth. The "atebrin" series lost their fever in 48 hours in 87 per cent of the cases, while those given quinine in 77 per cent of the cases gave the same results. No cases of "atebrin" poisoning were noted.

Chopra[14] experimented on eight monkeys, *Silenus rhesus*, infected with *P. knowlesi*. "Atebrin" was given either intravenously or intramuscularly. The concentration of the drug in the blood and the parasite count were determined half an hour, 2, 6, 24, 48 and 72 hours after the "atebrin" injections. The highest concentration of the drug in the blood was observed within half an hour of its administration. It could not be found in the blood 24 hours after its injection. The parasite count dropped with the fall in the concentration of the drug. The authors conclude that "atebrin" may have a direct lethal action on *P. knowlesi*. Chopra[15] *et alii* report seven cases of malaria in which "atebrin" or plasmochin, or both, did not give results. The cause was believed to be defective absorption. This may be due to heavy hookworm infection or hypochlorhydria, which is associated with dysentery and colitis, or rapid passage through the small intestine in diarrheas and dysentery.

Bercovitz[16] used "atebrin-musonate" in China and reports no toxic symptoms after the injections and the therapeutic results were excellent. Pregnant women and some children were in the treated series. He used quinine and plasmochin following the 2 injections of "atebrin-musonate" to bring back the general tone of the patient, as well as to take care of any stray parasites not killed by the injections.

Sealig and Singh[17] report that the combined "atebrin-musonate" and "atebrin" treatment is the best for the rapid restoration of fitness for military duty. The method used follows: a subcutaneous injection of 0.75 mg. epinephrine followed half an hour later by an intramuscular injection of 0.375 gram "atebrin-musonate." Twenty-four hours later a five-day course of "atebrin" tablets was started, 0.1 gram three times a day.

Dikshit[18] applied pharmacological tests to plasmochin and records the following:

(a) Tests on protozoa and bacteria show that plasmochin is not very toxic to these. Toxicity tests were also made in cats, dogs, rabbits, guinea-pigs and leeches.

(b) Plasmochin has no antipyretic action of its own. In combination with quinine, however, it produces a quicker action than quinine alone.

(c) Plasmochin reduces the blood pressure by acting directly on the heart and, also, by its action on the vasomotor center.

(d) It depresses the respiration and constricts the bronchioles to a slight degree.

(e) Movements of the gastro-intestinal tract are inhibited. Plasmochin produces a fatty degeneration of the liver cells when given in toxic doses.

(f) There is evidence of general depression of the central nervous system and a moderate stimulant action on the uterus.

Rosa and Maccolini[19] employed plasmochin in the prevention of malaria. They report that of all those who took a full course of treatment only 5.5 per cent contracted malaria, while those who took part of the course showed a rate of 17.2 per cent.

Ciuca *et alii*[20] report on the devitalizing effect of a single dose of 0.02 gram of plasmochin upon the gametocytes of subtertian malaria. They claim the dose is effective within 48 hours in most cases, but in practice the dose should be given twice weekly. Their series included 14 cases of natural infection, 5 cases infected by mosquitoes and 7 cases by blood inoculated infection. The blood of all patients was still infective for mosquitoes 4 hours after the administration of plasmochin. After 24 hours, 12 cases infected mosquitoes. After 48 hours, 4 cases were infective, but after the third day only 1 case remained infective.

Rosa and Valli[21] used "atebrin" and plasmochin as prophylactics in malaria. They held the incidence of malaria considerably below that of the previous year, about one-third as much as the year before. Their term "human bonification" implies intensive treatment of persons before the usual annual outbreak of malaria in highly malarious zones.

Mezincesco and Cornelson[22] report on the comparative efficacy of "atebrin" and quinine in malaria prophylaxis as follows:

(1) Neither prophylactic treatment with "atebrin" nor with quinine can reduce the number of parasite carriers to zero.

(2) The parasite index was appreciably reduced, whereas in the control group, which received no preventive treatment, the index remained the same.

(3) As a result of the preventive treatment there were

practically no clinical cases during the period of actual treatment in spite of the fairly large number of parasite carriers revealed by the periodic blood tests among the population subjected to the experiments.

Ciuca *et alii*[23] state that as regards direct antifebrile action and the time taken to cause the disappearance of the schizonts, there would seem to be little to choose between quinine and "atebrin." In the same report is a section by Parrot and his coworkers, of the Pasteur Institute, Algeria. They feel that quinine deserves to be rehabilitated as regards its action on gametocytes and that any antimalarial drug endowed with "schizonticidal" properties, *ipso facto*, possesses gametocidal properties in regard to sexual forms in process of development. They warn us that for the treatment of malaria patients, as for the protection of uninfected individuals, which necessarily go together in mass clinical prophylaxis, the exclusive and rational use of a good "schizonticide" is sufficient, and it is in any case better than the exclusive use of a good "gametocide."

Mietzsch, Mauss and Hecht[24] tell us that "atebrin" in watery solution decomposes by hydrolysis and this is accelerated by heat. By mouth, watery solutions should not be given later than 12 hours after their preparation.

Hecht[25] finds by his method that the liver, lungs, kidneys and spleen in this order took up the "atebrin" strongly, then follow the stomach and intestines, heart, pancreas and genital organs. The muscles, skin and central nervous system take it up very slightly.

Bhattacharjee[26] reports a single patient with subtertian malaria who became so violent that four men were needed to hold him in bed. He talked nonsense, kept his eyes closed tightly and resented all attempts to open them. His temperature was between 99.4 and 101° F. He improved rapidly on quinine and in about 24 hours his symptoms had disappeared.

Kang and Garvis[27] report a case in which maniacal symptoms developed following the use of "atebrin." The patient was a young, intelligent adult male, with no personal or family history of mental or nervous trouble, who developed maniacal symptoms two days after the completion of a five-day course of treatment with "atebrin." The total amount of "atebrin" taken was 1.5 grams. The symptoms lasted eight days.

Canet[28] says that mass quinine distribution had little value in the rubber plantations. Synthetic drugs gave better results. He feels that a combination of antilarval prophylaxis and mass treatment with synthetic drugs should produce a permanent improvement in the health conditions of the plantations.

Ragiot and Moreau[29] describe a severe case of subtertian malaria in which hematuria occurred subsequent to the administration of two intramuscular injections of 1 gram of quinine and 0.5 gram of the same drug by mouth. Injections of French "atebrin" were then given instead of quinine, 0.2 gram in the morning and 0.1 gram in the evening for 4 days. The patient improved quickly, the hematuria stopped at once, the parasites disappeared in three days, and treatment with quinine was then resumed without recurrence of the hematuria. Abundant parasites were in the blood during the occurrence of hematuria and the authors think this may be a point of distinction between hematuria due to quinine and hematuria of blackwater fever in which the parasites disappear from the blood.

Sicault and Messerlin[30] present a standard treatment for ordinary cases of malaria that consists of 0.3 gram of French "atebrin" and 0.03 gram of another synthetic daily for 5 days, followed by a continuous treatment of one dose weekly. In very severe cases the initial treatment consisted of the injection of 1.6 grams of quinine daily for the first two days, followed by three days' treatment with synthetic drugs.

Berny and Nicolas[31] report success in the control of malaria in a prison. Each Sunday everyone was given French "atebrin" 0.30 gram and 0.02 gram of another synthetic. This was kept up for six months. At the end of the period the parasite index was zero and in the neighborhood malaria was very prevalent. There was no sign of drug intolerance and no interference with work.

Rubinstein[32] reports on the use of a new drug, "acrichin." It is an analogue of "atebrin," which was used against *P. vivax* in general paresis cases for his experiment. The dose was 5 to 8 c. c. of a 3 per cent glucose solution of "acrichin" intravenously daily for a week, the same dose twice daily if given intramuscularly. It was given by mouth, in doses of 0.1 gram, thrice daily for a week. He treated 21 cases and had no relapse and no untoward effects from the drug.

Naegelsbach[33] discusses a preparation of quinine in weakly alkaline solution. Injections are free from the pain usually caused by quinine. One ampule given twice a day is equal to 15 grains of quinine hydrochloride.

Van Nitsen[34] presents a copper-containing organic preparation, prepared in the "Meurice" Laboratories of the Union Clinique Belge. It is described as copper oxyquinoline sulphonate of soda; a greenish amorphous powder soluble in water, of neutral reaction and stable in ordinary conditions of temperature and humidity. The daily dose recommended is 0.02 gram per kilogram of body weight for adults. It is given in divided doses in tablet form, each tablet containing 0.20 gram. No symptoms of intolerance have been noted. It is said to be as good as any of the drugs now in use and effective against all species of the parasites.

The modern use of transfusion has given us more and more information on how long and well certain individuals can carry the parasites of malaria without symptoms and after a thorough course of treatment. I shall offer a few references just to show how very unsafe it is to make the statement that a patient is parasite-free. A few drops of blood do not tell us all about the volume of blood in an individual in so far

as the presence or absence of a few malarial parasites is concerned.

Wang and Lee[35] report that 54 cases of benign tertian malaria and 6 cases of relapsing fever have followed blood transfusions in the Peiping Union Medical College Hospital in the ten-year period 1925-1935, during which 3,700 transfusions were performed. In one case a pregnant recipient was infected with relapsing fever and passed it on to her premature infant, who died of it. Malarial parasites were found in only one of 18 donors incriminated. One donor gave blood to ten people in 1925, and two became infected. He was not used again till 1933, when he infected 3 out of 10 inoculated with his blood. He admitted having a malaria-like fever 20 years before.

Thomas and Keys[36] report a donor who had served in India from 1927 to 1933 and who had never shown the parasites of malaria in his blood and had never, so far as he knew, had an attack of malaria. His blood was used for transfusion twice: 18 ounces on the first occasion and 10 ounces on the second. This was done on September 9, 1935, and on September 12, 1935, the recipient developed an attack of malaria (*P. vivax*).

Lorando and Sotiriades[37] report 23 cases of malaria in children treated with subcutaneous injections of maternal blood. Three injections of immune maternal blood, combined with small doses of quinine for from 5 to 10 days, are sufficient to effect a clinical cure and to develop an immunity the duration of which, however, has not yet been determined. The authors believe that the antibodies in the immune blood have no direct effect on the parasites, but act through the macrophages of the reticulo-endothelial system. Some authorities, such as Ascoli,[38] still believe in the use of epinephrine with antimalarial drugs. Ascoli considers that epinephrine, by reducing the congested portions of the enlarged spleen, destroys the breeding ground of the malarial parasite.

Muhlens[39] quotes Broughton-Alcock who, as a result of the examinations of 50,000 persons who had taken part in the World War, said:

"I can with certainty assert that malarial parasites in cases of war malaria do not remain in the blood more than five years after their return home."

[We wonder what transfusions from this group of 50,000 people would show in the recipients after the five years period mentioned.]

Mangiacopra[40] experimented with spleen extract in the treatment of malaria. He concludes that it has no therapeutic value in acute malaria or in the early stages of chronic malaria. In older chronic infections it can be used with marked benefit. It increases organic immunity, stimulates the reticulo-endothelial system and phagocytosis, improves the blood condition and general nutrition, and effects a marked reduction in the size of the spleen. He, therefore, believes that it is a valuable adjuvant in the treatment of chronic malaria. It has, moreover, a slight power of reactivating latent infections. A new view has been raised by Toporkov[41] on the localization of malarial parasites during the latent period of infection. He believes they are in the blood stream. The absence of parasites from the peripheral blood stream between attacks is attributed to an extreme diminution in their numbers, when the probability of encountering them in the thick drop film is near zero. This was corroborated by successful infection of general paresis cases with malarial blood which failed to show any parasites in the thick drop blood films examined.

Farinaud[42] makes a statement with which the writer agrees. He says that in spite of the admitted efficacy of the synthetic remedies in controlling malaria incidence, their prophylactic use is of limited applicability in Indo-China [and other places] where malaria can be considered as hyperendemic for not less than nine months of the year.

Earle and Perez[43] conclude that there is no way of predicting the presence of gametocytes in the blood stream. Nothing short of mass treatment could cover an attempt to treat the carriers.

Bastianelli,[44] in his discussion of the treatment of malaria and immunity, seeks to demonstrate that the current treatment of malaria does not interfere with the immunizing processes that lead to final cure. He emphasizes the time factor necessary for the acquisition of immunity. He discusses the view that, in a hyperendemic district, so-called radical treatment may reduce or prevent resistance to reinfection.

S. P. James[45] believes that lack of immunity is an important factor in causing an epidemic. Non-immune persons suffering from malaria show gametocytes more frequently and in greater numbers than in immune persons.

Clark and Komp's[46] seventh year's experience with malaria in the Chagres River villages of Panama is practically the same as reported in 1936. The average monthly parasite index for the "atebrin"-plasmochin towns, quinine-plasmochin towns and the voluntary quinine control area were respectively: 7.4 per cent, 14.4 per cent and 16.2 per cent. The cumulative parasite index for the year, however, is, respectively: 35.0 per cent, 37.0 per cent, and 35.9 per cent. The control area people were very irregular in their appearance on survey days and therefore do not show the high cumulative rate expected of people surveyed each month. The parasite index for age groups is very similar to the record for 1936. The peak was found in those people from 5 to 20 years of age, the greatest rate being 62.5 per cent for those people 10 to 20 years of age who were surveyed in all of the 12 surveys and 50 per cent for those 5 to 10 years of age. The other groups ranged from 30 to 40 per cent. It is again of interest to note that 16 persons over 60 years of age out of 68 examined were positive for parasites, but no clinical case occurred among them this year. These people have spent their lives on the banks of the Chagres River.

Fifty-eight infants born during the year or carried in the records from last year until they were 12 months old, as a special group, reveal the following: 4 positive for parasites in the first nine months of life; four positive for parasites in the 10 to 12 months of life, the general infant rate being 13.5 per cent. This is certainly proof that transmission is going on in the towns where plasmochin is in use. None of the babies regularly surveyed were from the control area. Another indication of transmission in the towns treated with plasmochin is that the mosquito index of infection in our second year's report was 0.48 per cent and for 1937 it is 1.1 per cent. The mosquito parasite index has not fallen with the human parasite index. Transient people and long *A. albimanus* flights may account for this as well as carriers developing between monthly treatment periods. The parasite species (excluding those reported as mixed infections) have the following incidence: *P. falciparum* 82.6 per cent, *P. vivax* 15.7 per cent, and *P. malariae* 1.6 per cent. During the year "crescent carriers" were recorded in *P. falciparum* cases as follows: 42.1 per cent in the "atebrin"-plasmochin towns, 37.8 per cent in the quinine-plasmochin towns, and 31.7 per cent in the control town (voluntary quinine). Clinical malaria is under good control from the viewpoint of an industrial organization, but we consider it suppressed malaria and not eradicated malaria in the people treated. Relapse[47] this year is practically the same as was reported last year.

The people are greatly improved physically and can carry on with almost no interruption due to malaria, but the human carriers are there and the mosquito index has not been reduced. We have not yet experienced any cases of mania or mental derangement following the use of "atebrin." I am of the opinion that quinine is just as effective a drug as "atebrin," but unless given under strict supervision, the people in the villages will not take quinine as they will voluntarily take "atebrin."

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RECENT ADVANCES IN THE EPIDEMIOLOGY OF MALARIA*

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INTRODUCTION

The Sub-Committee on Epidemiology for 1937 has followed the practice of this Sub-Committee in former years in presenting its annual report to the National Malaria Committee in the form of a short review of the more recent literature on the epidemiology of malaria. In one respect, however, this report is somewhat different: the review is not strictly confined to studies carried on outside of the continental United States. It appears to this Sub-Committee that the chief value of its published report is to individuals without good library facilities. For this reason, and because a report of this kind cannot contain a review of all the literature on the subject, we give here a brief review of some of the most interesting work which has appeared in literature available to us in the past year, without regard to its origin.

HILL MALARIA

Endemic malaria in high places is nearly always attended by interesting epidemiological conditions. Matlett[3] had heard of a disease of natives in the Belgian Congo called "Kapfuro" or "Kafindo-findo" for many years before he saw an authentic case. It proved to be *P. falciparum* malaria, and was one of several at Ruhengeri, which is at an altitude of 6,000 feet. The author thinks that malaria was introduced into these highlands by troops in 1917. White[4] records in great detail the result of his work on the epidemiology of malaria in the Jeypore Hill region of Bengal. Twelve anopheline species were examined, but only three of these were found to have gland infections: *minimus, varuna,* and *fluviatalis.* Malaria in this region, which has an altitude of 1,000 feet, is transmitted entirely by these species, whose habits are almost identical, although *A. culicifacies* dominates the anopheline fauna. In view of the importance of this latter species elsewhere as a vector, the author suggests the possibility that *A. culicifacies* may be a mixture of several sub-species as is the case of *A. maculipennis* in Europe. Calonne[5] records an instance of man-made malaria at an altitude of 5,000 feet in the plateau of Ituri, which lies across Lake Albert from Uganda. Small dams had been placed across ravines to impound water for agricultural purposes and these little ponds formed breeding places for *A. gambiae* and *A. christyi.* This place is normally non-malarious. Morin[6] and his collaborators report that malaria is very severe and blackwater fever quite prevalent in Indo-China at an altitude of 5,000 feet. The authors believe that malaria was introduced to the area under discussion by soldiers and emigrants from hyperendemic areas. The vector is *A. minimus.*

ANOPHELISM AND MALARIA

In the province of Siena, Italy, Buonomini and Govi[1] carried out an investigation to determine the anopheline fauna and its relation to malaria. They found *A. bifurcatus, Myzomia superpictus* and four subspecies of *A. maculipennis;* namely, *typicus, messeae, atroparvous,* and *labranchia* in the area examined. No malaria was found in the places where only *A. bifurcatus, A. m. typicus,* and *A. m. atroparvous* occurred; occasional cases of malaria were encountered where *M. superpictus* was found to be associated with these species; and a mild endemic malaria was found wherever *A. m. labranchia* occurred.

Missiroli[2] has studied the effect of climatic conditions upon *A. maculipennis* in a gallery especially constructed for the purpose. He finds that this mosquito exhibits a marked sensibility to change in climate; that it will forsake a condition conducive to its longevity for one more favorable to ovarian development. He believes that the influence of climate on the sexual life of *A. maculipennis,* and upon various phases of development of its larvae may explain why mass development of this species, of limited duration, sometimes occurs, with the sudden appearance of very high adult densities.

The influence of humidity on *A. maculipennis* has been studied by Collignon and Ambialet[8] at Taher, on the Algerian coast, where this mosquito is quite prevalent during May and June. It becomes very scarce in July and does not become plentiful again until September. Associated with the period of diminished prevalence great variations of relative humidity occur due to

*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

alternation of land and sea winds. The authors believe that the disappearance of *A. maculipennis* is associated in some way with this peculiar atmospheric condition.

Tagliabue and Perilli,[9] working in Milan Province, Italy, note that there is a very low malaria infection rate, but an intense infestation with *A. maculipennis messae* in this region. These workers found that *A. m. messae* has a predilection for animal blood, and conclude that this fact is largely responsible for the small amount of malaria found.

Reuter[16] describes in great detail a series of experiments designed to determine the factors influencing *A. maculipennis* in its choice of food. *Aedes aegypti* was used in initial tests, but was later replaced by *A. m. atroparvus* and *A. m. labranchia*. He found that temperature was the most important determining factor, but that atmospheric humidity was a contributing factor. Tests were made with a variety of substances rubbed on the skin of pigs and man, such as various acids, human sweat, human and pig feces and blood, skatol, indol, and ammonia. The only distinct stimuli to biting were induced by human and pig blood and pig feces. He is inclined to believe that odors play little part in attracting mosquitoes to a blood supply, but that the higher temperatures and humidity associated with buildings housing animals is attractive.

Drboholav[25] reported on malaria in sub-Carpathinian Russia, the easternmost of the four administrative divisions of Czechoslovakia. He stated that malaria had been known to exist in this region for many years, but that the cases were mild and few in number. In 1927 and 1928, however, there was a considerable expansion of the disease to the central and northwest parts of this place and some fifty cases were reported. There was a gradual decrease in endemicity until 1933, and in 1934 nearly 4,000 cases were reported. In 1936 a small number of *P. falciparum* infections were observed for the first time. The author believes that the mode of living of the population is largely responsible for malaria in this region. The people are gypsies and build their houses of sun-dried brick which are made of clay excavated at the site of the dwelling. *A. maculipennis* is the predominant anopheline species and breeds in the borrow pits formed when the houses are built.

Transmission of malaria north of the latitude of the Ohio River in the United States is very unusual, so that the report by Butts[27] of an outbreak of malaria in Camden County, New Jersey, is of peculiar interest to us. The author states that between 1912 and 1934 a total of 61 cases of malaria had been reported in Camden County, but that in the latter year 120 cases occurred in the northern portion of the City of Camden and in Pensauken Township. All of the cases were due to infections with *P. vivax*. Adults and larvae of *A. quadrimaculatus, A. punctipennis,* and *A. crucians* were found in the immediate vicinity of the area in which the outbreak occurred.

Anopheles sundaicus is an excellent vector of malaria that likes to travel: it is found in trains, but apparently prefers boats. White[7] records its spread into Lower Bengal in a very interesting manner. In March, 1934, only three breeding places of this mosquito were within the environs of Calcutta. A year later the number had increased to thirty-six, and *A. sundaicus* was responsible for a severe outbreak of malaria in Eastern Calcutta in the autumn of 1936.

Rice and Mohan[11] have investigated the possibility of active breeding of *A. minimus* during the cold season in Assam. They find that females will take blood meals and oviposit during the cold months; and that larvae feed and grow, although during January the aquatic stage is about 38 days. They conclude that active breeding occurs during the cold season and may be responsible for malaria transmission at that time; and that control measures should be instituted earlier than has been the practice.

In the Karnal district of the Punjab, fulminant epidemics of malaria frequently occur. Hicks and Majid[26] have kept six villages in this district under almost continuous observation for eight years in an effort to determine the factors concerned in the epidemiology of the malaria problem. They conclude that fluctuations in the dose of infection are sufficient to explain the fluctuations in the incidence, since there was little evidence of fluctuations of population immunity during the period of the observations. Dose of infection is determined chiefly by the length of the period of low saturation deficiency, which depends principally on an even distribution of precipitation, rather than on total annual rainfall.

Sinton's[28] discussion of man-made malaria in India might well apply to certain conditions in this country. The author considers that human activity may increase malaria in a given place in three general ways: (1) by creating conditions which lead to economic stress and lowered resistance; (2) by introducing gametocyte carriers into healthy areas, or susceptible individuals into endemic areas; and (3) from measures which result in an increase of *Anopheles*.

The occurrence of malaria associated with a mosquito which has peculiar breeding habits is described by de Verteuil and Spence.[12] They state that malaria was declining in Trinidad long before very much was known about the disease, due to farming practice, drainage and improving living conditions. The only two important vectors on the island are *A. tarsimaculatus* and *A. cruzi*. The latter species breeds in collection of water at the bases of the leaves of bromeliads. In recent years "immortelle" trees have been extensively planted for shade and have become intensely parasitized by bromeliads. Thus *A. cruzi* has been brought into intimate contact with people and is responsible for about 20 per cent of the malaria mortality.

In a short monograph Mira[10] describes the results of six years' work in Guatemala on malaria and malaria control. As elsewhere in Central America *A. albimanus* is considered to be the most important vector. It is prevalent in the lowlands, but is found at altitudes of

3,500 feet. Its presence is associated chiefly with *falciparum* malaria. *A. pseudopunctipennis* is also widely distributed, but prefers high altitudes. It appears to be most efficient in transmitting *P. vivax*.

Earle[17] reports that *A. grabhamii* has been found naturally infected. He has been able to infect it with *P. falciparum*, and finds that the development of the parasite parallels that in *A. albimanus*. *A. grabhamii* is found only in the Greater Antilles and Virgin Islands and is probably not an important vector since it is markedly zoophilic and is not very prevalent.

In this country we never associate malaria with mosquito breeding in waters in artificial containers, so that Symes'[13] finding of *A. funestus*, type form of the *funestus* series, breeding in a variety of domestic conditions in Kenya is of interest. He notes that the larvae of this mosquito can be constantly found in wells, and that he has found them in domestic receptacles of various kinds. He considers that some of the larvae may have been brought into the houses in well water, but that in certain instances active breeding takes place in the home. In this connection de Meillon,[14] in South Africa, notes that the percentage of *A. funestus* infected with *Plasmodium* is considerably higher for those caught in houses than for those caught out of doors.

Pirumov,[22] reporting on the progress of antimalaria work in Armenia, states that positive findings of malarial parasites fell from 48.5 per cent in 1926, when the work was begun, to 15.0 per cent in 1930; and to 28.0 per cent in 1932. At the same time incidence of infection with *P. vivax* rose from 48.3 per cent of all infections in 1926 to 81.4 per cent in 1931; and to 77.0 per cent in 1932. There was a consequent decline of incidence of infection with *P. malariae* and *P. falciparum*, which was most marked in the latter.

Ejercito and Mendiola[24] investigated cases of malaria reported in Manila to determine the possibility of the transmission of malaria in that city. Only three of the cases investigated appeared to indicate that this might be the case. Extensive observations were made on the anopheline mosquitoes in the area involved, and a large variety was collected. No infected mosquitoes were found and no specimens of *A. maculatus* or *A. minimus*, which are known to be the vectors of malaria in the Philippines. In no instance was an anopheline mosquito found inside a house. The authors conclude that malaria is not transmitted in Manila.

Williamson,[23] in a very interesting discussion of the relation of soil to malaria, suggests that an accumulation of organic nitrogen in the soil through agricultural or other agencies may be in part responsible for the condition of anophelism without malaria. He believes that the character of larval food must influence the physiological constitution and vectorial powers of adult mosquitoes; and he considered it probable that these effects may be brought about by the enrichment of the soil in organic nitrogen.

PARASITOLOGY

Sandicchi[18] reports inoculation experiments with *P. relictum* which seem to indicate that the sporozoites of this organism undergo a process of maturation in the salivary glands of the host mosquito. It appears then this process must take place before the mosquito becomes infectious.

Working in Macedonia, Barber[19] noted that *A. superpictus* is a relatively poor vector of malaria as compared with *A. elutus*. He believes that this is in part explained by the fact that the sporozoites of infected *A. superpictus* dissected during the summer months frequently show evidence of degeneration. The reverse is true for *A. elutus*. Laboratory experiments indicate that degeneration may occur in young sporozoites at summer temperature.

Earle and Perez[20] call attention to the difficulties attending drug control of malaria. For three years they kept a group of children under close observation, taking blood films at weekly intervals, or even more frequently where conditions warranted. They conclude that there is no way to predict the presence of gametocystemia, and that it is obviously impossible to examine a population often enough to identify carriers.

As a result of recent research Boyd and Kitchen[21] believe that gametocytes of *P. vivax* are produced at every period of multiplication, with the possible exception of the earliest divisions, until the defense mechanism of the host begins to check the evolution of the parasitic cycles. Mature gametocytes can be demonstrated within five days after the first appearance of parasites. On the other hand, *P. falciparum* gametocytes do not appear until the tenth day after the first parasites can be demonstrated, and their appearance may be deferred longer. It therefore appears that individuals with *P. vivax* infections may be able to infect mosquitoes almost from the inception of the illness; but that five or six multiplications of *P. falciparum* trophozoites are necessary before gametocytes are produced. The author's note that *P. vivax* gametocytes are about ten times more effective than *P. falciparum* gametocytes for infecting *A. quadrimaculatus*.

Williamson and Zain[29] have succeeded in infecting *Cul x bitaeniorhynchus* with *P. vivax* and *P. falciparum;* and, doubtfully, with *P. malariae*. While transmission of malaria with this presumptive culicine host has not been accomplished, sporozoites in the salivary gland were demonstrated. This work is of unusual interest because of the general belief that culicine mosquitoes are incapable of being infected with *Plasmodium* causing human malaria.

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RECENT ADDITIONS TO OUR KNOWLEDGE OF IMMUNITY IN MALARIA*

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Wilson and Wilson,[1] on analyzing their own and other findings, concluded that racial differences in spleen and parasite rates may be explained in terms of immunity and hypersensitivity and that immune status is not dependent on race, but upon frequency of infection.

Lintwareff[2] considers that the toxin formed by the malaria parasite is absorbed by hemoglobin of the red cells and passes into the blood plasma. The hemoglobin combined with the malaria antigen circulating in the blood stream causes a hyperplasia of the reticulo-endothelial tissue, especially that in the lungs and mesentery, whereby the antigen in this tissue becomes transformed into malarial antibodies.

James[3] states that lack of immunity is an important factor in causing an epidemic in that gametocytes appear in the blood more frequently and in greater numbers than is the case with immunes.

Boyd and Kitchen[4] showed that acquired immunity appears to be directed against the trophozoite stage of *P. vivax* rather than the sporozoites. Homologous sporozoites introduced into an immune person may eventually develop into trophozoites which provide a subclinical infection.

Chopra and Mukherjee[5] reviewed the mechanism of immunity in malaria.

Lorando and Sotiriades[6] treated malarial infections in children with subcutaneous injections of maternal serum. However, since quinine was administered in addition the contribution of the immune serum cannot be evaluated.

Sotiriades[7] also reported clinical improvement in seven malaria-infected paretics following intramuscular injections of 20 c. c. of whole blood taken from individuals with chronic malaria; in one case small amounts of quinine were given as well as the serum.

Cassuto[8] offered experimental results favoring the hypothesis that the reticulo-endothelial system is concerned in the establishment of immunity.

Boyd, Stratman-Thomas and Kitchen,[9] in studying immunity to *P. falciparum*, found that patients recovered from an infection with this parasite are refractory to reinoculation with the same strain insofar as clinical manifestations are concerned. Reinoculation of such an individual with a different strain may result in a more severe attack, even, than on the first occasion. There is therefore less indication that *P. falciparum* provides heterologous immunity than is the case with *P. vivax*.

Ashford[10] consulted the opinion of several authorities in the field of malaria regarding the question of immunity and its relationship to antimalarial therapy and summarized these views as follows: (1) Racial or inherited immunity to malaria while relative, definitely exists as a result of generations of exposure of the indigenous population. This form of mass immunity is specific for the several species of malaria last introduced into their native land. The native inhabitants of these hyperendemic malarial regions acquire malaria in infancy in practically 100 per cent, although in adolescence the parasitic rate may fall below 40 per cent, and in maturity even lower. It appears that because of this racial immunity, malaria has a relatively low mortality among the infant population and an exceedingly low mortality and relatively low morbidity among the native adults. (2) The wholesale application of antimalarial drugs to the indigenous population of hyperendemic malarial regions will certainly fail to eradicate this endemicity and furthermore may have a deleterious effect by suspending temporarily the defense mechanism of inherited relative immunity, thereby rendering the recipients of antimalarial therapy susceptible to clinical malaria. (3) Immunity to malaria insomuch as it relates to non-indigenous residents of a malarial region is individual; must be acquired by having the disease; is relative; is specific, not only for the species of the malarial parasite, but even to a certain extent for the

*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

*A report to the National Malaria Committee, 1937.

strain of a species. This individually acquired immunity which is born of the disease itself will attain maturity more certainly and more quickly when the disease is permitted to run its course within the individual without interference with the production of immunity resulting from the administration of antimalarial therapy. (4) Speaking in general terms, it is true that malaria is clinically cured by the development within the individual of an acquired immunity and frequently is not cured, but merely suppressed by drug therapy. This is especially applicable to tertian infections. When malaria is thus suppressed by drug therapy before the body has elaborated a specific immunity, it will under suitable conditions recur, often repeatedly until these immune processes have been completed. He concluded that immunity in malaria has at least two elements, the one being plasmodicidal and the other antitoxic.

Boyd and Kitchen[11] showed that recovered patients may experience no clinical reaction to an inoculum of 180 million parasites of the homologous *vivax* strain, although with such large numbers there may be produced what appears to be a subclinical infection. A very effective homologous tolerance may persist for several years, even in the apparent absence of a latent infection.

Boyd, Stratman-Thomas and Kitchen[12] presented data indicating that an acquired homologous immunity to a strain of *P. vivax* of sufficient strength to prevent a clinical attack may endure at least three years in the apparent absence of a latent infection.

Sinton[13] reviewed some of the problems and accomplishments in immunological research. He discussed (a) immunological differences in strains of plasmodia, (b) differences in pathogenicity of strains of plasmodia, (c) variations in the pathogenicity of different species and strains of *Plasmodium*, (d) natural resistance or tolerance to infection, and (e) acquired tolerance to malarial infections.

Rodhain[14] showed that four species of African monkeys, *Cercopithecus cephus, Cerocebus fuliginosus lunulatus, Cercopithecus griseo viridis* and *Papio jubilaeus* were susceptible to an Indian strain of *P. knowlesi*. In the latter two species the infection is fatal. In the first named species, the infection tends to be milder.

Coggeshall and Kumm[15] have demonstrated that protective antibodies are formed in the course of infections due to *P. knowlesi* and *P. inui* in monkeys. This contribution to the evidence in the question of a humoral element in the immunity in malaria is timely and valuable. While the reports appearing in literature on this subject have been somewhat conflicting it perhaps should be remembered that it may not be permissible, at least for the present, to assume that the findings in the case of one experimental animal will necessarily apply in the case of the human infection or in that of another experimental animal. These authors used pooled serum obtained from monkeys experiencing chronic infections. They found that when serum was given before inoculation or before and in small doses after, death of the test animal was delayed beyond that of the controls. When immune serum was given before, and in larger quantities after inoculation, the test animals survived. There appeared to be wide variation in the protective strength of different convalescent sera employed in making up the pools of immune sera.

Taliaferro and Cannon,[16] in a thorough study of the cellular reaction to *P. brasilianum* infection, conclude as follows: defense against this parasite involves chiefly (a) suppression of the infection through phagocytosis of intracorpuscular and extracorpuscular parasites by macrophages primarily of the spleen, to a less extent of the liver and to a still less extent of the bone marrow, and (b) replacement of the erythrocytes and lymphocytes. Development of the primary infection can be correlated step by step with the concentration and phagocytosis of the parasites as follows: (a) during the acute rise the parasites are concentrated in the spleen and to a less extent in the liver and bone marrow where they are sluggishly phagocytosed, (b) at the crises, the parasites are regionally concentrated in the spleen. They are held in the Billroth cords and do not pass into the venous sinuses. This suggests that the parasites either are agglutinated or adhere to the macrophages. Then within a day or two (sometimes more) they are aggressively ingested by the macrophages of the spleen. They are likewise more actively ingested by the macrophages of the liver and the bone marrow, but the structure of these two organs is not conducive to ascertaining if, here, they are also regionally concentrated. The macrophages at this time are engorged with all stages of parasites in all stages of disintegration. The organized red cells and parasites rapidly disappear, but the pigment remains for some time; (c) once crisis phagocytosis is initiated the infection is usually rapidly subdued. At this time the macrophages are filled with pigment. The pigment disappears in about three months provided it does not reaccumulate due to relapses; (d) following splenectomy there is a compensatory increase in phagocytosis in the liver and bone marrow and occasionally an increase in pigmentation in the lungs. After superinfection with large numbers of parasites, the active concentration and phagocytosis of the parasites begins within 1 hour instead of waiting for from one to several weeks. In other words, the acquired immunity takes time to develop, but once acquired, responds immediately. Acquired immunity to *P. brasilianum*, whether as a manifestation of recovery from the initial infection or as immunity to superinfection, depends: (a) primarily on the greatly increased rate of phagocytosis by the individual differentiated macrophages, chiefly of the spleen, to a less extent of the liver and still less of the bone marrow, and (b) to an increased number of macrophages in the spleen and bone marrow. The longer and more intense the malarial infection the more noticeable the increase in the number of macrophages. Concomitantly with the macrophage activity, if the infection

is not checked, a lymphoid hyperplasia occurs in the spleen. With an especially long and severe infection, it may even involve the liver and bone marrow. This acts as a mesenchymal reserve which replenishes and augments the supply of macrophages and lymphocytes. The transformation of lymphocytes into monocytes and macrophages can be particularly well seen in the spleen. Replacement of erythrocytes is restricted to an enhanced erythropoiesis of the bone marrow. No ectopic erythropoiesis has been found.

Goldfelder[17] states that in the Protozoological Institute of the Ukrain the melanoflocculation reaction of Henry has been employed in the diagnosis of malaria and the author considers it possible that with improvements the reaction may become as specific for malaria as the Wassermann reaction for syphilis.

De Alda Calleja[18] described Henry's original reaction and reviewed and evaluated subsequent studies with the summing up of the present status. He states that it is of value as a diagnostic measure and in gauging the progress in the course of treatment; that it is positive in 100 per cent of cases during the invasive stage after accessions of fever.

Trensz[19] showed that the melanin-euglobulin, unlike the flocculum produced by distilled water or 0.3 per cent sodium chloride, is insoluble in 0.9 per cent sodium chloride solution; that melanin and iron salts, but not a number of indicators and dyes, exhibited flocculating properties.

Villain and Dupoux[20] described a modified technic with an artificial melanin and conclude that the results are the same as with Henry's melanin. They got positive results in kala-azar, typhus and typhoid.

Chorine,[21] in a study of the mechanism of Henry's reaction, concluded that the reaction was not due to the presence of antibodies in the blood; melanin has only antigenic properties for animals normally deprived of this pigment; melanoflocculation is apparent 3 to 7 days after infection and antibodies take much longer to develop; the reaction is produced only in distilled water or hypotonic solutions; the flocculation in distilled water runs parallel with melanoflocculation; melanin acts merely as an indicator and as such can be replaced by other substances such as carmine; the reaction is attributable to an increase in the serum of euglobulins and lipoid substances which are precipitated by distilled water; heating to 55° C. for half an hour abolishes this reaction: the clinical value of the reaction is incontestable.

The substitution of laked blood for serum in order to simplify the technic of Henry's reaction was suggested by Spanedda.[22] He found the results strictly comparable to those with serum.

Wright[23] concludes that although Henry's reaction is not very often positive in the early stages of malaria, the consistently negative results obtained in non-malarial fevers makes it well worth while carrying out in early cases of fever in which no parasite can be found.

Trensz[24] describes at some length the conclusion at which he has arrived as the result of a very large experience of Henry's reaction, to the literature of which he has contributed much. He insists on the necessity of a standardized technic: it is a delicate reaction. Variations in technic make it difficult to compare the results obtained by different authors. Samples of blood should be taken during periods of apyrexia and when the patient is fasting; the serum should not be hemolysed. The author advocates the use of solutions of melanin, which he introduced, and the reading of the results with a photometer. The value of serologic curves is discussed. During an attack of malaria the determination of the reaction is of little importance, compared with the search for parasites, but in a patient who has recently suffered from fever, in whose blood no parasites are found, negative results with Henry's reaction are of value in excluding malaria as a cause of that fever. In treatment it is of considerable value; serologic curves register the result of treatment, especially in patients exhibiting post-febrile pathological conditions of spleen or liver. The curve continues to fall as long as the drugs employed are exercising a favorable action. The height of the index gives some indication in chronic cases as to the time that will be necessary for a complete cure to be effected, but no indication of the immediate gravity of the illness.

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RESEARCH UPON THE MALARIA PLASMODIA, 1936-1937*

THE ETIOLOGY OF MALARIA

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HUMAN MALARIA

Joly[1] (1936) states that in Brazzaville all stages in the development of schizonts and gametocytes of *Plasmodium falciparum* may be seen in peripheral blood films from children below the ages of 4 or 5 years suffering from malaria, but not in older children or adults. Typical "ring-forms" without pigment and ameboid forms with pigment are frequently observed, while all stages in the development of the schizonts were also present. Segmenting schizonts, containing as many as 30 merozoites, irregularly placed, were common, and intracellular forms of the gametocytes were also present. Some of the schizonts could be easily mistaken for schizonts of *P. malariae*. In view of the common observation that only "ring-forms" and fully developed gametocytes (crescents) are usually observed in the peripheral blood in infections with *P. falciparum*, these observations of Joly are important and raise the question as to whether such forms are found in the peripheral blood in children of the same age in other localities where estivo-autumnal malaria is endemic.

Nuclear division in the sporozoites of malaria plasmodia has been studied by Missiroli, Knowles and Basu, and DeMeillon. Missiroli[2] (1934), studying the sporozoites of *Plasmodium praecox* (*relictum*) demonstrated that they undergo division and that it is probable that the small portions resulting from such division infect the red blood cells. Many of the sporozoites in the salivary glands of *Culex* were noted to contain from 2 to 4 granules of chromatin systematically arranged within the cytoplasm. Knowles and Basu[3] (1935) noted that smears made from the infected salivary glands of *Anopheles stephensi*, and properly stained, showed sporozoites of both *P. vivax* and *P. falciparum* in various stages of nuclear division, sometimes as many as 2 or 3 separate nuclei being present in individual sporozoites. DeMeillion[4] (1936) confirms the observations of Missiroli and Knowles and Basu, finding in naturally infected mosquitoes in South Africa that the sporozoites in the salivary glands sometimes contained several nuclei distributed throughout their entire length. In some only 4 such nuclei were present, while in others a larger number were observed. He suggests that such a nuclear division in the sporozoites may be necessary before they become infective to the human host.

Ruge[5] (1936) believes that he has obtained evidence that supports James' theory that infection of man with malaria does not occur unless the sporozoites first enter the reticulo-endothelial tissues, where they change into other forms which eventually infect the red blood cells. He thinks that this theory is supported by the facts that the incubation period of tertian malaria is not influenced by the number of plasmodia introduced; that relapses occur despite specific treatment when the reticulo-endothelial system is heavily infected with sporozoites; and that the effect of treatment with "atebrin" and plasmochin support this view.

The possibility of binary fission of the "ring-forms" of the malaria plasmodia has received considerable attention in recent researches. Ewing[8] (1901) and Craig[9] (1905) first called attention to the fact that the "ring-forms" of the malaria plasmodia often contain two chromatin dots in their nuclei. Ewing found this to be true in *Plasmodium vivax* and Craig in *P. vivax, P. malariae* and *P. falciparum*, and both of these observers interpreted such forms as evidences of conjugation. LeDantec[10] (1929), Alessandrini[11] (1933), and Hingst[12] (1934) studied these forms and interpreted them as dividing forms. Recently Beach and Chaoulitch have investigated these so-called dividing forms and have concluded that they do represent true binary fission of the "rings." Beach[13] (1936), in a case of *P. vivax* malaria, found numerous red blood cells containing two "rings" and numerous "rings" containing two chromatin dots. He was able to trace what he regards as a process of binary fission in the "rings," and his paper is illustrated with photomicrographs showing the various stages in binary fission. He concludes that "under certain conditions the ring forms of the malaria plasmodia are able to reproduce by simple binary fission as well as by the usual method of schizogony." Chaoulitch[14] (1936), studying infections with *P. falciparum*, reaches the same conclusion, and describes the division of the chromatin dot of the "ring" and finally of the entire plasmodium. He believes that binary fission of the "rings" in this species of plasmodium accounts for the very rapid increase of parasites in malignant infections.

During the year there have been further observations upon *Plasmodium ovale*, and this species has been used in the treatment of paresis to some extent with favorable results, as recorded in the literature of 1935. Hauer[15] (1937) describes the results of the use of *P. ovale* in the treatment of paresis in neurological clinics of the Charity and West End Hospitals in Berlin, and his observations are of special importance as regards the morphology of this species as seen in various transfers of the parasite. He states that *P. ovale* was used in treatment because of the mild course of the disease produced by it. The most remarkable feature in his studies of the morphology was that, in the twenty-third passage, the number of merozoites, which had been typically 6 or 8, increased to 10, 12, 14 or 16, and

*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30--December 1-2-3, 1937.

that this number occurred with great regularity in subsequent transmissions. However, in the thirty eighth transmission, the typical 8-merozoite forms, as well as segmenting forms containing less than this number, recurred, and the 10, 12, 14 and 16 merozoite forms entirely disappeared. Hauer, with good reason, believes that there may have been a mixed infection with *P. vivax*, which, for a time, obscured the *P. ovale* infection, but further research is needed in order to ascertain whether *P. ovale* may, after repeated transfers, produce a larger number of merozoites than is usually observed.

The origin of Schüffner's granules in cells infected with *P. vivax* has been studied by Hingst[16] (1936). He made observations upon 953 parasitized cells scattered in 4,000 fields, using the panoptic method of staining with brilliant cresyl blue and Giemsa, and found all stages between basically stained reticular granules and the eosinophilic Schüffner granules. He considers that Schüffner's granules are of reticular origin, a conclusion previously held by Schüffner, Schaudinn and others. He found that these granules do not occur in all cells harboring *P. vivax*, as they appeared in but 36.4 per cent of the infected cells in one case, and in only 13.2 per cent in another.

MONKEY MALARIA

The infectivity of the plasmodium of one form of monkey malaria, *P. knowlesi*, for man was first demonstrated by Knowles and Das Gupta[17] (1932) and has since been confirmed by several investigators. The employment of *P. knowlesi* in the treatment of paresis in man was first attempted by Van Rooyen and Pile[18] (1935), using a strain of the plasmodium that they had transmitted previously to 12 human subjects. In all patients suffering from paresis they obtained a good febrile reaction with this monkey plasmodium, followed by distinct improvement in the condition of the individuals inoculated. Most recently, Chopra and Das Gupta[19] (1936) report the results in two cases of paresis treated by them with *P. knowlesi*, with favorable results, and conclude that

"inoculation with *P. knowlesi* places in the hands of the clinician a good method of malarial therapy in the treatment of neurosyphilis."

The chief interest of this species of monkey plasmodium to the student of the etiology of malaria is the ease with which man can be infected with it experimentally, and the question naturally arises: Does infection of man with this species ever occur in nature in regions where monkey infections are prevalent, and is it being overlooked or mistaken, in such instances, for one of the human malaria plasmodia?

Rodhain[20] (1936) describes experiments designed to demonstrate the pathogenicity of *P. knowlesi* for different species of African monkeys. Three *Cercopithecus cephus*, one *Cercopithecus griseo viridis*, two *Cercopithecus fuliginosus lunulatus* and four *Papio jubilaeus* were inoculated subcutaneously or intravenously with blood containing this plasmodium, and all became infected; but the severity of the infection differed in different species. Thus, in *Cercopithecus griseo viridis* and in *Papio jubilaeus*, the infection was acute with heavy infection of the red blood cells, followed by death, sometimes accompanied by hemoglobinuria, while in *Cercopithecus cephus* the infection was much milder and became chronic.

AVIAN MALARIA

It will be remembered that in 1935 Huff and Bloom[6] described, before this Committee, an avian malaria plasmodium, *P. elongatum*, having a quotidian period of segmentation and capable of living in all blood and blood-forming cells of the canary, and these observations have been confirmed by others, most recently by James and Tate[7] (1937) in the case of another avian malaria plasmodium, *P. gallinaceum*. These observers have found that in addition to having a schizogonic cycle of development within the circulating red blood cells, as well as a sporogenic cycle of development within *Aedes aegypti*, this plasmodium also has a schizogonic cycle of development in the reticulo-endothelial cells of the spleen, liver, kidneys and other internal organs, and, in some cases, within the reticulo-endothelial cells lining the capillaries of the brain. The authors mention that it is no longer correct to define the *Plasmodiidae* as a family in which the entire vertebrate cycle occurs within red blood cells, since in this species a schizogonic cycle occurs within the cells of the reticulo-endothelial system.

Wolfson[21] (1936) reports the successful transmission of *Plasmodium praecox* (*P. capistrani* Russell, 1932) to canaries by the intravenous injection of sporozoites. It is noted that all previous attempts to transmit avian malaria in this manner had proven failures, and the conclusion had been advanced that the sporozoites were rapidly destroyed when injected directly into the blood stream. The author obtained two successful and one unsuccessful result by the injection of sporozoites of *P. praecox* into the blood stream of canaries, the following technic being employed: The sporozoites contained in the salivary glands of 12 infected *Culex pipiens* were suspended in a solution of 1 per cent of sodium citrate in 0.7 per cent sodium chloride, to which 1 drop of sterile bovine blood serum was added per cubic centimeter, the sporozoites being obtained from the salivary glands on the eighteenth day after the infective blood meal. The sporozoites were kept in this solution for about 3 hours at room temperature and then one-half of the amount injected intravenously into 3 uninfected canaries, each canary receiving 150 mg. containing the sporozoites from approximately 2 infected mosquitoes. In the first canary injected the plasmodium was found after a prepatent period of 10 days; in the second canary the plasmodia appeared in the blood after a similar prepatent period, and in the third no infection

resulted. Four weeks after the original injection the blood of the second canary was injected intravenously into an uninfected canary, and this bird showed plasmodia in the blood within two weeks. From these results it is concluded that it is possible to transmit bird malaria by the intravenous injection of sporozoites as well as human malaria.

The periodic phenomena of the asexual cycle of *P. circumflexum* canaries had been studied by Wolfson[22] (1936), who reached the following conclusions regarding this subject:

(1) The degree of syncronicity in *P. circumflexum* is relatively high, since, at certain times, there is a complete lack of some growth stages and a large predominance of others.

(2) The largest amount of sporulation occurs during the late afternoon hours of every other day.

(3) The length of the asexual cycle is about 48 hours, since there is a 48-hour periodicity in the prevalence of any given growth stage.

(4) Two strains of *P. circumflexum*, isolated from a sparrow in this country and from a thrush in Germany, are similar in the character of their life cycle.

Warren and Coggeshall[23] studied the infectivity of the blood and organs in canaries after inoculation with the sporozoites of *P. cathemerium*. They were able to infect canaries with the sporozoites of this species of plasmodium, both by intramuscular and intravenous injection, and found that the time required before the circulating blood became microscopically positive was approximately the same with both methods of inoculation. They also found that there was a definite interval after inoculation during which the circulating blood was non-infectious, and that during this non-infectious period the plasmodia were held in the spleen, liver and bone marrow. They state that a clearance mechanism has been demonstrated for a plasmodium in canaries similar to that which exists for certain bacteria.

The subject of gametocyte production in avian malaria has been carefully studied by Gambrell[24] (1937), investigating *Plasmodium cathemerium* and *P. relictum* var. *matutinum*. The author refers to the previous work of Marchoux[25] (1922) and of Korteweg[26] (1930), who found that various strains of *P. falciparum*, of man, differed in their capacity to produce gametocytes, and then describes the results of her very careful and extensive experiments upon infections with the avian malaria plasmodia mentioned. With both species it was found that gametocyte production had a periodicity, pre-gametocytes being most numerous at the segmentation time of these plasmodia, that is, every 24 hours, and that the numbers are increased periodically while the new broods are distinguishable. The process of maturation usually required 30 to 36 hours, and, when the gametocytes were mature, the ratio of the two sexes was more nearly equal. Long-continued passage by subinoculation tended to increase the number of gametocytes of *P. cathemerium*, while mosquito transmission for three complete generations did not increase the percentages of gametocytes.

Experiments were also conducted with a strain of *P. cathemerium* which did not produce gametocytes, and it was found that this atypical strain failed to produce gametocytes when inoculated into its natural host, the English sparrow; that attempts to infect susceptible mosquitoes with this strain and to transfer the infection by mosquitoes failed; that the atypical strain showed a complete cross immunity to the typical strain and had no inimical effect on the typical strain in mixed infections; that serum from birds infected with the atypical strain when mixed with plasmodia of the typical strain had no effect upon gametocyte production, or *vice versa*, and that two birds infected with the atypical strain were still infected after 3½ years and sub-inoculation from these birds to uninfected birds resulted in infections that still presented atypical, or non-gametocyte-producing, plasmodia.

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OBSERVATIONS ON *PLASMODIUM KNOWLESI* MALARIA IN GENERAL PARESIS*

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In 1918 Wagner von Jauregg[1] inoculated with malaria patients suffering from general paresis. Upon termination of the acute attack of induced malaria, he found that there was considerable improvement in the mental condition of the patients so treated. This form of therapy was rapidly accepted and its use has become increasingly widespread. There remain, however, some objections in its general application for this purpose. In any community where there is endemic malaria there are likely to be found many individuals whose partial or complete immunity make them resistant to *Plasmodium vivax* infection. In addition, in Negroes there seems to be a natural or racial refractoriness to this type of malaria. Moreover, there are certain difficulties in maintaining an active strain of the malaria parasite which is adaptable for human use unless there are a sufficient number of patients available to whom it may be transferred at regular intervals.

It was of considerable interest to malariologists when Knowles and Das Gupta,[2] in 1932, announced that they had successfully inoculated three human volunteers with a strain of monkey malaria and obtained a clinical response similar to that observed with *P. vivax* infection. They also noted that the disease terminated without the intervention of quinine. The strain of parasite used was named *Plasmodium knowlesi* by Sinton and Mulligan.[3] In the rhesus monkey this parasite was found to produce a fatal infection unless treated. However, if antimalarial drugs were given early in the course of the disease, the infection in the monkeys assumed a chronic form and persisted for many months or even years. Van Rooyen and Pile,[4] in England, made careful studies of the clinical behavior in 12 cases of general paresis treated with *P. knowlesi* and concluded that it was a valuable therapeutic agent. They found that patients with this type of malaria responded readily to quinine and routinely gave this drug following eight paroxysms. Nicol[5] reported the use of *P. knowlesi* in 76 paretics and felt that as a therapeutic medium for general paresis it was not the equal of vivax malaria. However, Ciuca and his colleagues[6] in Roumania have reported their observations during a similar study on nearly 200 cases and announced very favorable results.

The true evaluation of *P. knowlesi* in the treatment of general paresis cannot be definitely made until a large number of carefully controlled studies are completed. Regardless of the outcome, the contributions mentioned above are of extreme importance for several reasons. This was the first time that man and an experimental animal had been known to be consistently susceptible to the same malaria parasite. It afforded, therefore, many opportunities for clinical and biological experimentation which heretofore was not possible.

Should this form of therapy prove to be of definite value for the treatment of general paresis, many advantages are at once apparent. Difficulties in maintaining a strain of plasmodium would be eliminated, since the blood of a rhesus monkey with a chronic infection would be available for transfer over a long period of time. In man the infection is usually self-limiting and if necessary can be readily controlled with quinine. If hyperpyrexia, as produced by malaria infection, is desired for the treatment of any other condition, infectious material is available from a non-luetic source. Since valuable information might be obtained by using *P. knowlesi* for the treatment of general paresis, a study was undertaken emphasizing the clinical reaction in paretics following infection, the parasitic manifestations, and the therapeutic result obtained.

PROCEDURE

Thirty-five patients hospitalized for general paresis at the Manhattan State Hospital were given malaria treatment using *P. knowlesi*. In this series there were 20 patients who had never been infected with malaria, while the remainder had previously undergone mild attacks or had failed to become infected with *P. vivax*. Twenty-nine were white patients and six were colored. The strain of *P. knowlesi* used was obtained from the London School of Hygiene and Tropical Medicine in 1934; since then it has been maintained in rhesus monkeys.

For the initial case an intramuscular transfer was made from monkey to man, using 1.0 c. c. of blood containing *P. knowlesi* parasites. After establishing the infection, intravenous transfers were made direct from one patient to another. The amount injected varied from 1.0 to 5.0 c. c. of whole blood, with the number of parasites ranging from one-half million to fifty million per inoculum.

Thick and thin blood films were made and examined daily for three months following the inoculation unless quinine was given, in which case they were discontinued. If, after this period of observation, a rise in the temperature was noted, routine blood examination was resumed.

A parasite count was made daily on each of the blood films, and was expressed as the number of parasitized cells per 10,000 red blood cells.

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*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30–December 1-2-3, 1937.

*From the Laboratories of the International Health Division of The Rockefeller Foundation and the Manhattan State Hospital, New York City.

CLINICAL OBSERVATIONS

Susceptibility.—The 29 white patients inoculated were all found to be susceptible to *P. knowlesi*, while six Negroes reacted very mildly or not at all. Blood specimens from four of the latter showed parasites in the thick film only and the remaining two were negative throughout. These two negative cases were noted to have experienced subclinical attacks, however, as subinoculation of their blood to normal monkeys revealed the presence of parasites for as long as three weeks following inoculation.

The time between inoculation and the noting of a progressive rise of temperature, which is designated as the incubation period, varied in white patients from three to 13 days, with an average of five days.

The clinical course of *P. knowlesi* malaria very closely resembles that of *P. vivax* malaria, the outstanding difference being the shorter term of the former. An occasional slight sustained rise of temperature was noted during the incubation period. The onset was usually acute with a fever of about 39° C. (102.2° F.) on the first day. Then followed daily paroxysms of intermittent fever with peak temperatures of 40 to 41° C. (104 to 105.8° F.) for about ten days. After this period the temperature declined gradually to normal and the attack terminated spontaneously. In one instance the acute attack was limited to a single paroxysm. The number of paroxysms per patient varied from 2 to 15, averaging 10. Only about one-half of the patients experienced one or more definite chills. There were no complications noted in this series of cases.

Treatment.—It was not found necessary to interrupt the course of the malaria because of the severity of the attack in the first 24 cases. In the next patient, treatment with quinine was instituted because untoward symptoms were noted in combination with a heavy parasitic infection. (Two similar cases have been observed subsequently among 10 additional cases in another group.) Quinine was also administered to five patients with mild clinical relapses. It was noted that all the cases responded promptly to quinine.

PARASITOLOGICAL OBSERVATIONS

Parasites usually appeared in the blood in quantities sufficient to be detected by the microscope at about the time of the onset of the fever. In the typical case there was a steady rise in the number of parasitized cells and the maximum parasite count usually occurred shortly after the mid-course of the clinical symptoms. After this there was a gradual decrease with complete disappearance about the time the temperature returned to normal. The highest count rarely exceeded 100 parasites per 10,000 red cells, and in 75 per cent of cases was less than half this amount. Five patients showed maximum counts ranging from 100 to 300 parasites per 10,000 red cells. Of particular interest was the patient in whom the maximum count was 1,200 parasites per 10,000 red cells. This count appeared suddenly, rising from 153 on the preceding day. Prompt administration of quinine led to the disappearance of parasites within 48 hours. Two comparable counts have appeared in patients in later series.

Relapses, both parasitological and clinical, occurred in this group of patients. In the total 29 patients treated, there were 11 cases which showed parasitic relapses of short duration only, including six mild clinical relapses. The longest period noted was three days. Three patients who had previously undergone both *P. vivax* and *P. knowlesi* malaria had parasites in their blood on the first, seventy-second and one hundred twenty-seventh days, respectively, after inoculation. In each case a transfer of patient's blood to a rhesus monkey resulted in a typical attack. Consequently, these three cases were considered to be proven instances of relapses following malaria induced by *P. knowlesi*. Only one patient showed clinical symptoms, and this was for one day only, with a temperature of 41° C. (106° F.).

In addition, there were three patients with no history of previous vivax malaria who showed relapses on the twenty-third, thirty-third and forty-third days after inoculation with *P. knowlesi*. One of them had a three-day clinical relapse. These relapses were doubtless due to *P. knowlesi*. Another patient showing a one-day parasite relapse had previously had both types of malaria and, since his blood was not subinoculated into a normal monkey, the relapse was considered as a questionable *P. knowlesi* relapse.

In four instances both parasitological and clinical relapses occurred and rhesus tests made at the time of relapse were all negative. For each of these patients there was a history suggestive of a former malaria attack, but none had been given therapeutic malaria previously. These four are considered to be vivax relapses subsequent to a course of treatment with *P. knowlesi* malaria.

EFFECT ON GENERAL PARESIS

The effect of the malaria treatment upon the 29 white patients with paresis was determined two months after the last patient had recovered from his acute malaria. Among 14 patients who were given only *P. knowlesi* malaria, two were discharged from the hospital classified as "remissions," six were listed as improved, and six as unimproved. Eight patients, who had previously been given vivax malaria for therapeutic purposes and showed no beneficial effects, were given *P. knowlesi* malaria, resulting in improvement in six, while two remained unchanged. The seven remaining patients were inoculated with *P. knowlesi* without influencing the course of the paresis. As their infections were judged to be too brief to produce the maximum benefit, they were reinfected with *P. vivax*. Among the seven patients in this group there were three remissions and four improved cases. It was evident that there was a beneficial effect obtained following *P.*

knowlesi infection in 14 patients, or 48 per cent, among 29 white patients with paresis.

DISCUSSION

A comparison of the relative effectiveness of *P. knowlesi* and *P. vivax* malaria in paresis therapy is not justified, owing to the small number of cases studied to date. The results reported indicate that the mistake should not be made of considering *P. knowlesi* a harmless parasite. This is particularly brought out in the three cases in which the infection, based upon the number of parasites, was suddenly transformed from one of moderate severity to one of rather serious proportions. Although these patients responded favorably to quinine therapy, it should be pointed out that, owing to the suddenness in the appearance of severe manifestations, the patients should be kept under daily surveillance, both clinically and parasitologically. Throughout this study it was the aim to let all cases terminate in spontaneous recovery, if possible, since it was desired to get the benefit of the maximum course of the disease.

Relapses in *P. knowlesi* malaria were not unexpected, but it had been considered that a parasite, being introduced into a new host with a resulting infection followed by so prompt a recovery, might be completely eradicated. Such is apparently not the fact, as relapses occurred in more than one-third of the cases. It was noted with interest that these relapses became more numerous in the latter part of the series. This, together with the fact that the severe cases all appeared late in the series, suggests that the parasite may become better adapted to the human host following successive transfers. *P. knowlesi* was transmitted through 22 serial human passages

SUMMARY AND CONCLUSIONS

The clinical reaction, parasitic manifestations, and the therapeutic results obtained by infecting 35 paretics with *P. knowlesi*, a monkey parasite, are described. Susceptibility appeared to be universal from studies of 29 white persons, but in six negroes there was almost no response. An incubation period of four to six days after intravenous inoculation is followed by a quotidian fever of about ten days' duration, generally with spontaneous recovery. The intensity of parasitization of red cells is usually on a par with the ordinary vivax malaria, but occasionally rises to high levels which may exceed 1.0 per cent of total red cells. However, the infection yields readily to quinine therapy. A disadvantage, therefore, is the possibility of the appearance of an infection which may be quite heavy yet not be at once apparent clinically. The use of this parasite in a standard treatment for general paresis may be limited. The desirable features of employing *P. knowlesi* in white persons, aside from the therapeutic effect, are the moderate course of the infection, usually terminating in spontaneous recovery, and, when the infection is not thus terminated, the patient's ready response to quinine. Relapses are not unusual and may occur after intervals as long as four months after the initial infection. Some value of *P. knowlesi* malaria as a therapeutic agent for general paresis was demonstrated in 48 per cent of the cases treated.

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Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1938. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Single copies, 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

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Volume 31 AUGUST 1938 Number 8

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-Second Annual Meeting
Oklahoma City, Oklahoma, November 15-18, 1938

ANEMIA IN THE UNDERPRIVILEGED

Anemia would appear to be a common condition among the Southern poor, and there is much evidence to indicate that it is a dietary anemia that is now the commonest type. Hookworm and malaria as causes are less frequently encountered than formerly, at least in urban populations. Hemoglobin, the oxygen carrier, is of course essential to the life of every cell in the body. Even a slight decrease is said to lower markedly the resistance to disease.

The bloods of a series of Negro obstetrical cases in Atlanta have been studied by Chappell and Bivings,[1] whose report appears in this issue of the JOURNAL, an important contribution to the subject of the conduct of gestation. Non-pregnant gynecologic patients of the same social status examined by these authors had an average of 9.1 grams of hemoglobin per 100 c. c. of blood. Since the normal accepted by the authors is 16.92, the gynecologic patients had an average hemoglobin of 53.8 per cent. In pregnant patients the average was 9.22 grams, with a tendency to fall despite various treatments. These patients may be taken as typical of the Negro population of a Southern city, who live on a diet inadequate in several elementary food materials.

Stephenson,[2] of Philadelphia, has studied a similar hypochromic anemia of different dietary etiology in presumably well fed infants in a Northern orphan asylum. She reports on the effects on the blood picture of administration of two different kinds of iron salts. The children in her series were from three months to two years of age, and their average hemoglobin was 11.12 grams per 100 c. c. at the beginning of the study.

There is some disagreement as to normal hemoglobin values. Kolmer and Boerner,[3] in their book published in 1931, give standards as follows:

Males (18 years and over) 15.76 grams per 100 c. c. (range 13.5 to 19)

Females (18 years and over) 13.76 grams (range 10.98 to 16.49)

Children (1 to 15 years) 10.6 grams (range 10.2 to 11.0)

Others use higher normals. Stephenson's children before treatment had a hemoglobin higher than the Kolmer and Boerner normal. She attempted to determine whether iron salts would benefit these children, and if so, which form of the metal was most effective. Two popular forms of iron were employed, a ferrous and a ferric salt. To one group of infants over a period of three months 30 grains per day of ferric ammonium citrate were given; to another 6 grains of ferrous sulphate. Controls were maintained in the institution on the same diet without the addition of any iron. Hemoglobins rose in each of the iron groups from an average of 11.7 grams to almost 14 grams, with a tendency to fall when the iron salts were discontinued. The children who received iron improved notably in appearance and color, becoming rosy in the palms of the hands and soles of the feet. The effects upon the blood picture were about the same for the two groups, which showed definitely that the hemoglobin level could be raised by administration of iron to a point considerably higher than that defined as normal in 1931, and with apparent good effects on the general welfare of the children. Among the infants on ferrous sulphate the hemoglobin rose a little faster and a lit-

1. Chappell, Amey; and Bivings, Lee: Anemia and Pregnancy: A Three-Year Study on Negro Women. The JOURNAL, this issue, page 876.

2. Stephenson, Ruth: Hypochromic Anemia of Infants: Comparison of the Efficacy of Ferric and of Ferrous Iron. Amer. Jour. Dis. Child., 55:1141 (June) 1938.

3. Kolmer, John A.; and Boerner, Fred.: Approved Laboratory Technic. New York: D. Appleton & Co., 1931.

tle higher than in the ferric ammonium citrate group. Since the ferrous preparation contained only one-fifth as much metallic iron as did the ferric, Stephenson considers ferrous sulphate to have been much more effective. Either preparation contained enough copper as impurity to supply the copper requirement, so that she considered it unnecessary to administer copper at all in the treatment.

These two studies in different parts of the country confirm the belief that a dietary hemoglobin deficiency is frequent. It is generally believed that it is difficult to raise a low hemoglobin during pregnancy. In infants, the largest single item of food is milk, and milk is notoriously deficient in iron. Iron was decidedly beneficial as a supplement to the ration of a child-caring institution. Six grains of ferrous sulphate daily might be a valuable addition to the infant dietary for as long a period as milk is an important part of it.

The pregnant Negro women studied by Chappell and Bivings took milk in insignificant quantities. Lack of iron was apparently not the chief defect of the ration, which was probably low in vitamins and in essential proteins and fats. Iron was not beneficial; other simple additions to the dietary induced some improvement. For prenatal care in cases of this type, cheap vitamin, protein and fat sources need to be discovered; and doubtless a period on the better ration before the beginning of pregnancy would be most helpful.

The hemoglobin molecule is complex and many factors operate in its synthesis. The hypothesis might be offered that, barring organic disease, the hemoglobin level of the patient is the fairest single criterion of the adequacy of his diet.

INFECTIVITY OF LATE SYPHILIS

The body often has great difficulty in ridding itself of all disease-producing bacteria after a generalized infection. Following complete clinical recovery from tuberculosis the tubercle bacillus is encapsulated in foci in the body, frequently remaining viable years after the disease is controlled and seems to be non-infectious. Healthy carriers of *Eberthella typhi* and *Corynebacterium diphtheriae* are fairly common, showing that the human organism has in some way become capable of symbiosis with these pathogens. In these two instances, of course, the innocent contact may suffer, and develop typhoid or diphtheria. According to Warthin, the great syphilologist, living spirochetes are to be found after careful necropsy search in the tissues of every case of lues, and no variety of treatment ever completely frees the body of these micro-organisms. There has always been a strong school of physicians who believe that syphilis is incurable and that syphilitics should never marry, though the more usual recommendation before marriage and reproduction is two to five years of freedom from symptoms.

Probably because lues is a venereal disease, there is a general belief that the patient's semen contains spirochetes in the late stages of the disease, after other manifestations are controlled. And because of the frequency of cerebrospinal syphilis, the spinal fluid is believed in late stages to harbor these micro-organisms. Studies of the infectiousness of body fluids in late and untreated lues have been made by Kemp,[1] of Chicago, who includes in his report a review of the literature on this subject. Kemp inoculated material from fifteen cases of late syphilis into the eyes and testicles of rabbits; spinal fluid and semen were thus tested by animal culture for the presence of *Treponema pallidum*. The patients examined had had the disease for from four to thirty years. Six of them were entirely untreated; the remainder inadequately treated. The results of all animal inoculations were negative. No treponemata could be demonstrated in the body secretions of any of the fifteen old cases, a finding which would hardly have been predicted by internists, since the common belief is that semen may remain infectious indefinitely.

From a review of the literature Kemp concludes that a positive spinal fluid and positive semen are common in early syphilis; that the organisms are found with about the same frequency in semen and in spinal fluid; that a positive semen occurs in about 19 per cent of cases of early syphilis, and in only 1.9 per cent of late cases of the disease. Only in the early stages do the body fluids contain spirochetes; only in the early stages are the fluids in themselves infectious. Though this does not mean that the late disease is not transmissible, it has some bearing upon the subject of the marriage of luetics.

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GLEANINGS FROM RECENT JOURNALS

Treatment of Baldness.—The gamma rays, or short penetrating rays of radium, according to Palumbo,[1] of Florence, Italy, have very definite and predictable effects on hair growth. The skin erythema dose of x-ray or radium was a universally employed indicator of measurement of radiation dosage until very recently. The gamma ray effects on skin Palumbo believes to be more constant than the erythema. When radium is applied to a hairy region so that gamma rays from crossed fields according to his technic reach the skin, the hair falls out completely at the end of a three-week period, although the skin is not visibly altered. A month later a fine down appears over the denuded region, and this new hair is thicker than the old and of a darker color, even in subjects more than 70 years old. A true rejuvenating process takes place in the hair system. The effect may be repeatedly obtained, but eventually the hair fails to grow out again. Gamma radiation thus may be used to treat baldness, or for superfluous hairs of women. Palumbo reports stimulation of growth of denuded eyebrows and removal of feminine whiskers.

Proposed methods of control of hair growth are always of interest, and are usually subjected to extensive clinical trial.

Antitetanus Serum.—About 30 per cent of cases of tetanus recovered spontaneously before the advent of antitoxin, and this fact has made it difficult to evaluate the curative effect of the modern treatment. The tendency has been for physicians in the presence of symptoms of lockjaw to inject larger and larger doses of antitoxin, as they have done with diphtheria antitoxin. The increase of dosage followed of course upon the occurrence of many fatalities after smaller quantities.

Tetanus antitoxin is an effective preventive if given sufficiently early. Under what circumstances it fails to neutralize toxin has been extensively studied by Abel and Chalian,[2] of Johns Hopkins University, in dogs and monkeys. Injected toxin was sometimes washed out by them by an ingenious technic to show how rapidly it could be fixed by the tissues. Animals were also treated with antitoxin at varying periods after injection of the toxin.

Even the highly susceptible monkey whose tissues had fixed many lethal doses of toxin could be saved and kept from showing any signs of tetanus if antitoxin were given during a certain stage in the incubation period, before the appearance of general symptoms of the disease. Occasionally, forty hours after the injection of three lethal doses of toxin life could be saved, though the tissues had fixed the toxin much earlier. The larger the toxin injection, the earlier it was necessary to make the injection of antitoxin, to prevent the onset of tetanus.

In the presence of a local tetanus, the authors say, a large dose of antitoxin may still save life. After the development of general tetanus, antitoxin was never effective. It was thus not curative of the disease after symptoms had developed, but it was capable of neutralizing toxin which had been fixed in the tissues and of preventing spread of toxic symptoms.

Vaccination with tetanus toxoid, a simpler substance, will, it is hoped, greatly reduce the incidence of the disease and the need for antitoxin.

Vitamin C in Tuberculosis.—A test for vitamin C in urine was developed by Harris and Ray in 1933, after the discovery that the vitamin, if ingested in adequate amounts, is excreted daily in considerable quantity. In normal persons, if excess cevitamic acid is ingested, most of it appears in the urine. In scurvy, even after the pure vitamin is administered in large quantities, the demand for it by the tissues is so great that very little escapes through the kidneys.

Various conditions other than scurvy are said to increase the demand of the tissues for vitamin C, or to reduce its excretion. Bumbalo,[3] of Buffalo, says that C excretion is low in all forms of tuberculosis, and in most other febrile conditions.

In fever the rate of oxidation in the body of course is increased. C is believed to be concerned in oxidation, and therefore should be used up most rapidly when the metabolic rate is high.

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TWENTY-FIVE YEARS AGO

From Journals of 1913

Vanderbilt Endowment.[1]—"Another large gift to medical education comes in the offer of a million dollars from Mr. Andrew Carnegie for the medical department of Vanderbilt University, Nashville, Tennessee. * * * the school, in spite of * * * obstacles * * * has always been an ardent champion of reasonably high standards of preliminary and medical education. Located as the University is, in the State which at present has the weakest legal requirements regulating the practice of medicine, the gift, if accepted, will have a beneficial effect on medical education not only in Tennessee but also in the entire South."

Intern Work Required.[2]—"Rush Medical College will require all students entering for the summer quarter of 1914 and thereafter to register for a five-year medical course. The fifth year is to be spent by the student either in graduate work in one of the departments of the college or as an intern in an approved hospital under the constant supervision of the college faculty. * * * This makes three medical colleges which have definitely decided to require the fifth year of intern or other clinical work. In 1910 the University of Minnesota College of Medicine adopted the requirement for all students entering in the fall of 1911 and thereafter. A few weeks ago also Leland Stanford Junior University Department of Medicine announced a similar requirement for all students entering in 1914."

Protein-free Diet in Chronic Nephritis.[3]—"It is held * * * that a protein-free diet for a continuous period of from five to ten days can be maintained without harm to the individual. With such a restriction the accumulated end-products of protein metabolism in the blood are promptly eliminated, the nitrogen content of the blood falls to normal, and the kidneys and heart are given an opportunity to rest."

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Oklahoma City — Where We Meet

INFORMAL STORY OF THE NATION'S WONDER STATE*

In the year 1541, a weary band of men in trail-stained armor walked slowly over rolling, primeval prairie land. Before them the illusion of the fabulous Land of El Dorado, with its seven golden cities of Cibola; behind them league upon league of foot-sore travel through jungle, mountain, desert and plain. At the head of the band was a bearded man whose eyes sought the far horizon. His name was Coronado. The land was Oklahoma, Land of the Red People, which in the next 300 years was to know the tramping feet of Spanish soldiers, the soft tread of nomadic Indian tribes, French trappers and Mexican raiders, the unshod feet of ponies, the cutting feet of trail herds and the frenzied rush of settlers into a new country.

It was to be the forty-sixth state in 1907; fifteenth in area of all the states and larger than any state east of the Mississippi; with nearly 3 per cent of the country's agricultural output, more than 10 per cent of its mineral wealth and an annual production of new wealth totaling approximately one billion dollars.

Oklahoma is still the home of the Red People, but the more than two-score tribes represented within its borders through voluntary or forced migration from 1817 to 1840, form today but slightly more than 120,000 of the state's 2,650,000 people. A part of the Louisiana Purchase, Oklahoma has paid in millions of dollars the two cents per acre of original cost paid to France. A part of Arkansas Territory shortly after the turn of the Nineteenth Century, then divided into the Territory of Oklahoma and Indian Territory, united in 1907 to form the present state of Oklahoma.

With an area of 69,414 square miles, it is 460 miles from east to west; from north to south 226 miles. In the Mississippi basin, drainage flows into that stream through the Arkansas and Red rivers and tributaries. The state as a whole is a plain inclining from the northwest to the southeast, broken by four minor ranges of mountains and low lying hills. High elevation is in the Black Mesa, in extreme northwestern Oklahoma, at 4,500 feet. The lowest point is 350 feet above sea level in the Red River valley.

Oklahoma has been frequently called a geologist's paradise. In southwestern Oklahoma, the Wichita Mountains project the jagged tops of an unburied range over a thousand feet above the surrounding plain. The Arbuckles, in the south-central section, consist of a comparatively level plateau surrounding porphyry monadnocks, with peculiar alternations of hard and soft rocks standing on edge, in unique designs.

The Ouachita Mountains (pronounced Washita), in the southeast portion, are chiefly composed of long, narrow, parallel, battlement ridges, mainly formed of hard, resistant sandstone, separated by valleys of softer and more easily eroded

*Prepared by the Publicity Department of the Oklahoma City Chamber of Commerce for the Southern Medical Journal.

Indian Chiefs greet visitors in Oklahoma.

shale. In the northeast are the Ozarks, perched on a westward sloping plateau.

A further geological freak, nature placed in northwest Oklahoma the Great Salt Plains, an area of dazzling white saline salt six by eight miles in size and as level as a table top. This gigantic deposit is said to be the residium of a great, prehistoric inland sea. Throughout the western part of this unusual terrain are gypsum hills with an east-facing mansard scarp, fading into undulating prairie extending to the limit of vision.

Among recreational and pleasure resorts of Oklahoma are Platt National Park, at Sulphur, in Murray County, where important medicinal waters are found. The Kiamichi, Winding Stair and other mountains of southeast Oklahoma with their clear, swift streams abound with fish and other sport may be had in season with deer and turkey. Medicine Park and Lake Lawtonka, in the Wichita mountains near Lawton, south and west of Oklahoma City, draw many visitors for recreation and sporty lake fishing. Nearby is Fort Sill with its military reservation in which is located the Field Artillery School of Fire of the United States Army.

Fort Reno, the army remount station, near El Reno in Canadian County in central Oklahoma, has many fine horses in its stables, while for historical diversion there are the old Indian campaign forts of Fort Arbuckle, near Davis, from which all basic property lines of the state are run; Fort Towson and Fort Gibson, in southeast Oklahoma where Sam Houston was a frequent visitor. For a survival of pioneer days, there is Major Gordon W. Little's Old Trading Post near Pawnee, still active. (You may know him as Pawnee Bill.)

In modern forms of amusement, there are many polo clubs in the state, fine golf courses, fishing, hunting, ample recreational and vacation spots in almost any direction, combined with visits to oil fields, among them the amazing new development in the Oklahoma City field within the shadow of the state capitol building. There are thousands of fine animals on Oklahoma's hillsides. At the Junior Livestock Show in Oklahoma City each March, and the Oklahoma State Fair in September; the State Dairy Show in Enid, and smaller showings over the state are many of the finest animals in the middle west, frequently national champions.

In education, Oklahoma is a forward state. To take care of its blind, deaf, orphans, those in need of physical correction and vocational rehabilitation, there are eleven eleemosynary institutions in which vocational training is taught and many persons are shown a means of future livelihood.

There is a great state university, a major agricultural and mechanical college and four minor schools of similar nature; six state teachers college; a college for women; military school; three junior colleges; state negro university; ten denominational universities and colleges; many denominational boarding schools, several government Indian schools and both state and privately owned hospitals in most of which are found rehabilitation departments. Special pride is taken by all Oklahomans in its State University Medical School.

With a short winter and exceedingly long summers, hot days are not of long duration and nights are comfortably cool. Only Los Angeles, San Diego and Denver, in the order named, had more average, annual hours of sunshine last year than did Oklahoma City.

Oklahoma is a young state, vigorous, growing, developing, looking to the future like a young man.

Tourists from older states who join in increasing numbers the motoring vacation throngs on the modern highways of Oklahoma to enjoy its appealing panorama of hills, plains and playgrounds are astonished to see the modern skylines of its larger cities. Some from afar still have thought of Oklahoma in terms of the Indians and cowmen who gave it a picturesque background in other years.

Today Oklahoma marches in the forefront of wealth-producing states, generously endowed with natural resources, cosmopolitan in citizenship, replete with appeal for the tourist and new resident.

Book Reviews

Materia Medica, Drug Administration and Prescription Writing. By Oscar W. Bethea, M.D., Ph.G., Ph.M., F.C.S., F.A.C.P., Professor of Clinical Medicine, Tulane School of Medicine; Professor of Therapeutics, Tulane Graduate School of Medicine; Member Revision Committee, U. S. Pharmacopoeia, Etc. Fifth Revised Edition. 577 pages. Philadelphia: F. A. Davis Company, 1938. Cloth $5.00.

The major part of this book is devoted to materia medica in which the drugs are discussed in alphabetical order. The author adheres to the Latin terminology in the description of the drugs as well as in his sample prescriptions.

In the discussion of each drug the following points are given: Latin and English names, synonyms, form, official preparations, odor and taste, solubility, incompatibilities, average dose, therapeutic actions, and uses and method of administration. All of these are stated in very brief form except the administration, which is discussed in more detail and sample prescriptions are included. The toxicology of certain drugs is described, but is omitted for many others.

The section on prescription writing is complete and should be of real value to the medical student and young practitioner.

The author has failed to include any of the following in the text: the vitamins, endocrine products, insulin, protamin-zinc insulin, metrazol, sulfanilamide, mandelic acid and many others.

The book is well printed on good paper. The Clinical Index and the General Index seem to be complete and accurate.

Surgical Pathology of the Diseases of the Neck. By Arthur E. Hertzler, M.D., Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas, Professor of Surgery, University of Kansas. 237 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1937.

Dr. Hertzler now adds another to his impressive series of monographs. With his usual informality he takes the reader into his confidence as he reviews his personal experiences with lesions of the neck. These, he says with possible over-enthusiasm, "comprise a wider range than those of any other region of the body." Nothing dismayed, but with emphasis on the need for careful study of the whole life history of the general diseases and with constant reminder of the necessity here for close cooperation between surgeon and pathologist, he proceeds first to divide the lesions into five great groups. These are the primary and secondary tumors, congenital diseases, affections of the salivary glands, and inflammatory affections. The general diseases of each group are then treated individually in the remaining nine chapters of the book. Hertzler speaks as a practical surgeon with a background of pathological training. His material comes from his own clinic. Whether or not the reader agrees with all the conclusions drawn, he can at least be sure of a stimulating look into the personal experiences of a man who has done his own thinking. The author does not hesitate to admit his own shortcomings while expressing his convictions as they have developed in the hard school of experience. And who could refuse to condone the occasional *faux pas* committed, as he says, "in periods of pathologic abstraction associated with a corresponding lapse in things anatomic."

The reader familiar with preceding volumes of the series will find here the usual Hertzlerian individuality. The material is handled much like that of an actual teaching clinic and the book becomes in fact an extended clinical lecture. An occasional hiatus in the list of the diseases might be pointed out, but after all the author is telling of those things that he himself has observed. Thus syphilitic lymphadenitis is mentioned merely "as a conciliative gesture to effete centers where syphilis is common." His own lack of material is natural, since such a lesion "does not concern Kansans."

The book is illustrated with a wealth of good photographs both gross and microscopic and the press work is excellent.

Hernia, Anatomy, Etiology, Symptoms, Diagnosis, Differential Diagnosis, Prognosis and the Operative and Injection Treatment. By Leigh F. Watson, M.D., Member of Attending Staff of California Lutheran Hospital and Methodist Hospital of Southern California, Los Angeles. Second Edition. 590 pages, illustrated. St. Louis: The C. V. Mosby Company, 1938. Cloth $7.50.

In the first edition of Watson's "Hernia," it is stated in the "Preface" that the object of this book "is to present within reasonable space the most important features of the anatomy, etiology, symptoms, diagnosis, differential diagnosis, and prognosis of hernia, together with the best operative technic of modern surgeons." A praiseworthy undertaking!

In the preface to the second edition he says: "The adoption of the modern injection method of treatment of certain types of reducible hernia by many industrial corporations, insurance companies and state industrial commissions, necessitates the revision of this book." He further states that "Emphasis has been placed on the original Halsted operation for inguinal hernia by the silk technic, to conform to present-day practice, which is replacing fascia lata transplant in certain cases of large and recurrent inguinal hernias."

Since the weight of professional opinion, up to the present time, is strongly against the substitution of injection for operation, the endorsement of injection methods by industrial corporations and insurance companies cannot escape the impression that such endorsement may be influenced more by financial than scientific considerations.

In contrast to the emphasis which in the preface was laid upon silk technic, the author says in discussing suture material: "I believe that absorbable suture material should always be employed in all varieties of hernia operations."

The anatomy of hernia and descriptions of typical operations are well presented, and the book is well illustrated.

The types of hernia best suited to injection treatment and contraindications are carefully pointed out.

When one considers the reports which are appearing in the literature of various unsatisfactory experiences with the injection treatment of hernia, the impression is inescapable that this method of treating hernia has been presented in too favorable a light.

A Textbook of Pathology. Edited by E. T. Bell, M.D., Professor of Pathology in the University of Minnesota, Minneapolis, Minnesota. Third Edition. 894 pages, illustrated. Philadelphia: Lea & Febiger, 1938. Cloth $9.50.

A textbook of pathology is no longer merely the study of morbid form, but an attempt to present an accurate conception of an ever-changing process which produces a series of symptoms collectively termed disease. The revised edition of this reliable text reflects this healthy trend. The book follows the usual plan of division into general and special pathology and has been brought to date by the addition of a large amount of new material. The subject matter is comprehensive, well arranged, concise, clear and capably handled by the author. Five contributors of special topics maintain the excellent standard of the text. Each section is followed by a short but adequate reference list, with an explanatory note after each to direct the reader to the special feature of the paper. The illustrations are well chosen and well produced. The book is recommended as an excellent text for students and a useful reference for physicians.

Maternal Care Complications: The Principles of Management of Some Serious Complications Arising During the Antepartum, Intrapartum, and Postpartum Periods. Approved by the American Committee on Maternal Welfare, Inc. Prepared by R. D. Mussey, M.D., P. F. Williams, M.D., F. H. Falls, M.D., and F. L. Adair, M.D., Editor. 95 pages. Chicago: The University of Chicago Press, 1938. Cloth $1.00.

This booklet, edited by Dr. F. L. Adair and approved by the American Committee on Maternal Welfare, Inc., deals with the three major causes of maternal mortality: toxemias of pregnancy, obstetric hemorrhages, and puerperal infection. The common conditions are discussed in some detail, whereas the rare, infrequent types are merely touched upon. In the chapter on "Toxemias of Pregnancy," no attempt is made to classify the toxemias except that they are grouped under two headings, the chronic toxemic state and the acute toxemias. Similarly, obstetric hemorrhages and puerperal infections are grouped very simply. Statistics are given from the publication "Maternal Mortality in Fifteen States," the report on "Maternal Mortality in New York City," and the report of the Philadelphia County Medical Society on maternal mortality. The prenatal care, prevention, signs and symptoms, and treatment of the major causes of maternal death, are covered briefly but fully. All the accepted methods of diagnosis and treatment are given with, of course, those methods most approved by Dr. Adair and his co-authors.

Mental Therapy Studies in Fifty Cases. By Louis S. London, M.D., Assistant Physician Central Islip State Hospital, Central Islip, New York and Manhattan State Hospital, Wards Island, New York. Vol. 1, 427 pages; vol. 2, 345 pages, illustrated. New York: Covici Friede, publishers, 1937. Published in two volumes. Cloth $12.50.

Modern psychiatry owes much to psychoanalysis. Regardless of our opinion of its value, we must acknowledge its contribution as a tremendous stimulus to research in abnormal behavior.

The author has assembled fifty selected cases subjected to analysis, covering the wide field of the neuroses, sexual perversions and the psychoses. This is preceded by a section on the historical evolution of psychotherapeutics. The case reports are written in a clear, simple style, some in considerable detail, and make interesting reading. An attempt is made, throughout, to show the interrelation between the neuroses and psychoses and to demonstrate modern psychoanlytical methods. As a reference work on "mental therapy," its practical value to other than the psychoanalyst is questioned. Many of the conclusions are nothing more than interesting speculations, incapable of proof, and some of the interpretations of dreams are as convincing as a horoscope.

One is unimpressed by the author's therapeutic results. Until work of this type is controlled by comparative studies with patients treated by simpler, less time-consuming methods and untreated cases, the results are meaningless and its efforts should be confined to carefully selected cases. However, anyone interested in psychoanalysis will find this an interesting presentation of the subject.

Plastic Surgery of the Nose. By J. Eastman Sheehan, New York. Second Edition, Entirely Rewritten. 186 pages, illustrated. New York: Paul B. Hoeber, Inc., 1936. Price $9.00.

That there is a conspicuous place for so restricted a subject, the author clearly establishes in his "Preface" when he says: "There may have been a time when personal appearance was accepted as the pleasure of the gods and when people bore their fate without protest. This is not true of our day. The meek we still have with us, but they have their living to earn in a highly competitive society. Cyrano's bulbous nose did not bar him from fame, but salesmen are not chosen from among those who have broken or bulbous noses."

The problems of rhinoplasty are taken up systematically. Chapter II deals with typical and distinctive operations; Chapter III, with classified corrections at the three nasal levels; the bony vault, the upper cartilaginous vault, and the lower cartilaginous vault. Chapter V gives helpful details in regard to instruments, sutures, preoperative preparation, postoperative care, and to a discussion of different kinds of grafts.

The monograph is profusely illustrated with drawings, photographs and colored plates.

This is a valuable book for the plastic surgeon.

The Practice of Urology. By Leon Herman, B.S., M.D., Professor of Urology, University of Pennsylvania, Graduate School of Medicine; Urologist to the Pennsylvania Hospital and to the Bryn Mawr Hospital; Consulting Urologist to the Methodist Episcopal and Burlington County (New Jersey) Hospitals. 923 pages, illustrated. Philadelphia: W. B. Saunders Company, 1938. Cloth $10.00.

This practical treatise on the diseases of the genitourinary system is an expression of the author's experience. One must be a student and have access to an unlimited amount of clinical material to be able to prepare and illustrate a text covering the field of urology that is elementary enough to serve as a text for the student and general practitioner, and yet sufficiently advanced to be of value as a reference for the urologist.

The diseases are discussed under the following head-

ings: (a) Incidence, (b) Pathology, (c) Clinical Features, (d) Diagnosis, (e) Prognosis, and (f) Treatment.

The problems that arise daily in the diagnosis and treatment of urologic conditions are covered, and all material is modern and up to date. Differences of opinion are presented. References are given at the end of each chapter. The illustrations are clear and complete.

Surgical procedures are not included. As the text was prepared mainly to meet the needs of the general practitioner and those not specializing in urology, the portion devoted to surgery naturally is very limited.

An extensive section is devoted to venereal diseases and gonorrhea, which alone makes the book exceedingly valuable. No better text has been published on the diagnosis and general treatment of urological conditions.

The Postmortem Examination. By Sidney Farber, M.D., Associate in Pathology, Harvard Medical School, Pathologist to the Infants' Hospital and the Children's Hospital, Boston. 201 pages, illustrated. Springfield, Illinois: Charles C. Thomas, 1937. Cloth $3.50.

This book is a useful, instructive and stimulating guide to an orderly method of necropsy study. It begins with a carefully planned historical sketch of the principles in the development of pathology. A description of the ideal morgue is given with its common equipment. A chapter is devoted to general regulations, emphasizing orderliness, purpose and cleanliness. A number of primary incisions are outlined and variations of the Y-incision recommended. Clear and concise presentations of the Virchow, and also variations of the Zenker technics for removal of the viscera are included. Particular directions are given for the examination of infants and children. Concluding the treatise is an appendix containing valuable weight tables, a word stressing the importance of cooperation on the part of pathologist, hospital and undertaker, and lastly the reproduction of a protocol by Virchow. The book should prove valuable to the young pathologist, the medical student and the practitioner who is occasionally called upon to perform an autopsy.

Treatment in General Practice. By Harry Beckman, M.D., Professor of Pharmacology at Marquette University School of Medicine, Milwaukee, Wisconsin. Third Edition Revised and Entirely Reset. 787 pages. Philadelphia: W. B. Saunders Company, 1938. Cloth $10.00.

In this popular book by Beckman the new and the untried are not given a place, the discarded methods are eliminated, and the workable new methods are included and the useful of the old are retained. Several new sections have been added as obesity, malnutrition, menstrual disturbances, diseases of the liver and bile passages, disturbances of water, salt and protein balance, disturbances caused by excessive heat, the anemias and blood disturbances other than anemias. As entities for the first time appear: acidosis, Addison's disease, alkalosis, amenorrhea, anorexia nervosa, celiac disease, colon consciousness, dehydration, drug allergy, epidemic dropsy, Gee-Hekter-Heubner disease, hemiplegia, hypomenorrhea, idiopathic steatorrhea, infantile diarrhea, insomnia, intermenstrual pain, Meniére's disease, menopause, menorrhagia, metrorrhagia, myasthenia gravis, nontropical sprue, nutritional edema, oligomenorrhea, osteomalacia, otitis media and complications, paranasal sinusitis, phlebitis, physical allergy, pompholyx, proctalgia fugax, progressive muscular dystrophy, prophylaxis of venereal disease, renal rickets, torulosis, unstable colon, visceroptosis, von Gierke's disease and xerophthalmia. This is a most useful book, as the author has compiled methods of treatment which have been well tested and which he can recommend from his own practical experience.

A Monograph on Veins. By Kenneth J. Franklin, M.D., M.R.C.P., Tutor and Lecturer in Physiology, Oriel College University Demonstrator of Pharmacology; Assistant Director of the Nuffield Institute for Medical Research, Oxford. 110 pages, illustrated. Springfield, Illinois: Charles C. Thomas, 1937. Cloth $6.00.

This is a scholarly treatise by one who is probably the world's greatest authority in this limited field. Following an interesting historical discussion, the anatomy, physiology and pharmacology of the veins are discussed. This takes up most of the book, but there is a brief chapter dealing with clinical aspects of various diseases of the veins. Perhaps the most valuable part of the book is the bibliography, which covers fifty-four pages and includes more than one thousand references.

The author writes with an unusually clear, smooth style. The whole tone of the book is indicative of his scholarly attitude toward the subject. Although the practicing physician will find relatively little of direct use in the book, anyone who proposes to undertake anatomical, physiological or other research work on the venous system will find this an invaluable book.

Southern Medical News

ALABAMA

Dr. Oma E. Herndon succeeds Dr. Herbert Caldwell as Chief Medical Officer at the U. S. Veterans' Administration Facility at Tuscaloosa. Dr. Caldwell has been transferred to Ithaca, New York.

Dr. Edward B. Pitts, Fairfield, and Miss Katherine Shaefer, Opelika, were married in April.

Dr. John MacMillan Townsend, Birmingham, and Miss Ann Kemper, Owenton, Kentucky, were married February 5.

DEATHS

Dr. Walter Bozeman Moorer, Repton, aged 63, died January 16.

ARKANSAS

There will be held in Hot Springs, October 21-22, under the auspices of the Committee on Evaluation of Serodiagnostic Tests for Syphilis of the United States Public Health Service, a meeting of laboratory workers from the entire country, and physicians and health officers interested in the control of syphilis. Surgeon General Thomas Parran will be the Chairman.

Ninth Councilor District Medical Society has elected Dr. W. T. Moore, Everton, President; Dr. H. V. Kirby, Harrison, First Vice-President; Dr. O. B. McCoy, Harrison, Second Vice-President; and Dr. J. G. Gladden, Harrison, Secretary-Treasurer.

During the month of May a graduate course in pediatrics was given through the State under the auspices of the Children's Bureau, U. S. Department of Labor, the Arkansas Medical Society and the Arkansas State Board of Health. Dr. Jean Valjean Cooke, Associate Professor of Pediatrics, Washington University School of Medicine, St. Louis, Missouri, was the lecturer.

The Nashville Hospital was reopened in May with Dr. John W. Redman as Resident Surgeon. Dr. Redman lived formerly in Fort Smith.

Dr. A. W. Strauss, Little Rock, has been appointed to the Board of the McRae Hospital Memorial Tuberculosis Sanatorium.

Dr. C. S. Holt, Fort Smith, has been elected a Trustee of the Mid-West Hospital Association.

Dr. W. E. Berry, Dr. G. O. Campbell and Dr. O. V. Smith have each moved into new office locations at Trumann.

Dr. John E. Parsons, Jr., is now associated with Dr. S. P. Bond in practice at Little Rock.

Dr. H. A. Causey, Pine Bluff, has been doing postgraduate work in surgery at New York.

Dr. John J. Andujar, Little Rock, has accepted the position of pathologist to the Methodist Hospital at Fort Worth, Texas.

Dr. R. M. Sloan, Jonesboro, has been elected President of the Arkansas State Board of Nursing Examiners.

Dr. J. W. Amis, Fort Smith, has been elected First Vice-President of the Alumni Association of the University of Arkansas.

Dr. Hoyt R. Allen, Little Rock, was elected a Fellow of the American Proctologic Society at its recent session in San Francisco.

Dr. F. G. Engler has moved from Mountainburg to Chester.

Dr. R. H. Evans has moved from McCrory to Chatfield.

Dr. M. B. Crow and Miss Virginia Ederington, of Warren, were married June 12.

Deaths

Dr. James R. Autrey, Columbus, aged 79, died June 17.

Dr. William H. Byrd, El Dorado, aged 79, died April 3 of arthritis, heart disease and urinary suppression.

Dr. Matt S. Dibrell, Van Buren, aged 71, died June 1.

DISTRICT OF COLUMBIA

A bill was introduced in Congress on April 28 authorizing a new building for the Army Medical Library and Museum in Washington. This library, frequently called the Surgeon General's Library, is the largest medical library in the world, containing over a million volumes, including books and pamphlets. The bill provides for a building not to exceed in cost $3,750,000, which will give enlarged and modern facilities for the care and use of this library.

George Washington University Medical Society has elected Dr. Oscar B. Hunter, President; Dr. Arnold McNitt, Vice-President; Dr. Leslie H. French, Secretary; and Dr. J. Burton Glenn, Treasurer, all of Washington.

The American Therapeutic Society, at its annual meeting April 2, elected Dr. Oscar B. Hunter, Washington, President; and Dr. Joseph F. Elward, Washington, Secretary.

The American Association of Pathologists and Bacteriologists elected Dr. Earl B. McKinley, Washington, President. The next annual session will be held at Richmond, Virginia, April 6-7, 1939.

The Medical Society of Saint Elizabeths Hospital, Washington, was organized last year as an alumni society of the institution, being composed of present and former members of the medical staff of the hospital. This Society held its first annual dinner in April. Dr. Winford Overholser was recently appointed Superintendent of the Hospital. Physicians who have previously served at the hospital and who are interested in learning more about the aims of the Society should write to Dr. Jay L. Hoffman, Secretary, Saint Elizabeths Hospital, Washington, D. C.

Dr. Thomas Parran, Surgeon General, U. S. Public Health Service, Washington, has been awarded the Mendel Medal for 1938 by Villanova (Pennsylvania) College in recognition of his scientific approach to the problems of public health.

Dr. Walter L. Treadway, Assistant Surgeon General, U. S. Public Health Service, Washington, has been appointed Medical Officer in Charge of the Federal Narcotic Farm at Lexington, Kentucky, succeeding Dr. Lawrence Kolb, who has been transferred to Washington to become Assistant Surgeon General.

Deaths

Dr. Royal Samuel Copeland, United States Senator from New York, aged 69, died at Washington June 17.

Dr. Francis McQuillan, an active member of the Medical Society of the District of Columbia since 1909, died at Providence, Rhode Island, June 10.

FLORIDA

The Florida Section of the Southeastern Surgical Congress will meet at the Florida State Hospital, Chattahoochee, August 27.

At the meeting of the State Board of Medical Examiners held in Jacksonville recently, Dr. Julius C. Davis, Quincy, was reelected President. Other officers elected are: Dr. Harold D. Van Schaick, Jacksonville, Vice-President; and Dr. William M. Rowlett, Tampa, Secretary-Treasurer.

Dr. A. L. Huskey, Chattahoochee, has resigned from the staff of the Florida State Hospital and assumed a position on the resident staff of the Grady Hospital, Atlanta, Georgia.

Dr. Estella G. Norman, Miami Springs, spent part of April and the month of May visiting England, France, Germany, Italy and Switzerland.

Dr. Charles W. Boyd and Dr. A. K. Wilson, Jacksonville, recently took a postgraduate course in ophthalmology at George Washington University, Washington, D. C.

Dr. E. Frank McCall has moved from Hobe Sound to Neptune Beach.

Dr. Hilliard W. Willis, Coral Gables, has moved his offices to 2605 Ponce de Leon Avenue, where he will specialize in pediatrics.

Dr. William G. Doerne, Daytona Beach, is doing research work in cancer and leukemia during the summer months at Mercy Hospital, Milwaukee, Wisconsin.

Dr. Haynsworth D. Clark, Fort Pierce, has been named President-Elect of the Florida Railway Surgeons Association and was reelected Secretary-Treasurer.

Dr. Alvin L. Stebbins, Punta Gorda, has been appointed Health Officer of Escambia County, succeeding Dr. William H. Pickett, Pensacola, resigned.

Deaths

Dr. Clarence Eugene Brinckerhoff, Miami, aged 78, died April 19 of chronic myocarditis, arteriosclerosis and nephritis.

Dr. Perry M. Lewis, Orlando, aged 46, died April 30.

GEORGIA

The Chattahoochee Valley Medical Association, at its recent meeting held at Radium Springs, elected Dr. J. S. Turberville, Century, Florida, President; Dr. G. J. Dillard, Columbus, First Vice-President; Dr. C. R. Bennett, Eufaula, Alabama, Second Vice-President; Dr. Frank K. Boland, Atlanta, Secretary-Treasurer; and Dr. Seale Harris and Dr. Gilbert F. Douglas, both of Birmingham, Alabama, members of the Council.

The newly organized Industrial Surgeons Association at its meeting in Augusta recently, elected Dr. Cornelius F. Holton, Savannah, President; Dr. Robert L. Rhodes, Augusta, Vice-President; and Dr. John W. Simmons, Brunswick, Secretary-Treasurer.

The Georgia Pediatric Society elected Dr. Lewellyn H. Muse, Atlanta, President-Elect. Dr. Charles Hall Farmer, Macon, was installed as President, succeeding Dr. Roger W. Dickson, Atlanta.

At a recent meeting of the Reserve Officers' Association, held at the Georgia School of Technology, Dr. Wm. Perrin Nicolson, Jr., Atlanta, was installed as President of the Fifth District Chapter of this Association.

Dr. Abram J. Davis, Director of Health of Burke County, was elected President of the Southeast Georgia Public Health Association at its recent meeting in Waynesboro.

Dr. William L. Gilbert, Health Officer of Fulton County, Atlanta, has resigned on account of ill health, but will continue in the position until his successor has been named.

The Strickland and Son Memorial Hospital, Griffin, has elected on its staff Dr. W. C. Miles, President; Dr. T. I. Hawkins, Vice-President; and Dr. Geo. L. Walker, Secretary.

Dr. Roy W. McGee, Ben Hill, has been elected Fulton County Commissioner of Health.

Dr. Ralph E. Porter has been appointed Superintendent of the Marine Hospital in Savannah, succeeding Dr. Joseph S. Bolton, who has been assigned to Washington. Dr. Porter has been Superintendent of the U. S. Marine Hospital, Fort Stanton, New Mexico, since 1934.

Dr. Chas. E. Boynton and Dr. Charles E. Boynton, Jr., announce the opening of their offices in the Doctors Building, Atlanta.

Dr. Henry Bagley Benson and Miss Miriam Copeland, both of Atlanta, were married in April.

Deaths

Dr. William Henry Baxley, Jr., Hephzibah, aged 74, died April 22, of coronary thrombosis.

Dr. Benjamin H. Brock, Hogansville, aged 70, died April 1 of carcinoma of the liver.

Dr. Robert Bayard Lamb, Demorest, aged 59, died June 5.

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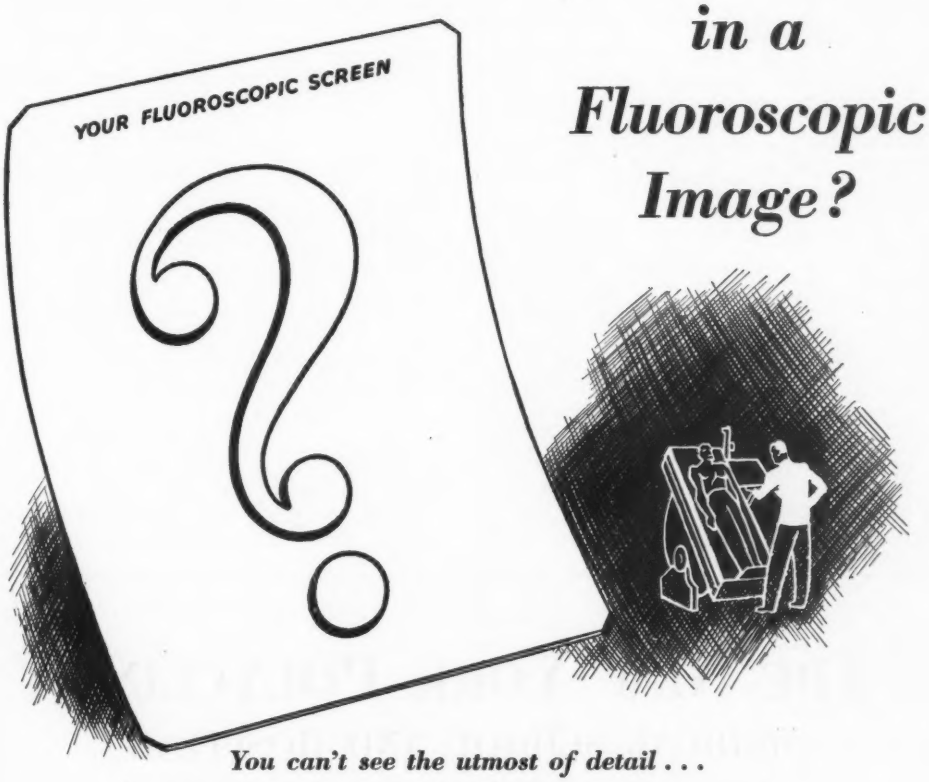

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Continued from page 958

Dr. Uldrick McLaws Kieffer, Atlanta, aged 48, died May 24.

Dr. Jennie Newman Norris, Atlanta, aged 76, died April 5 of carcinoma.

Dr. J. C. Trentham, Cedartown, aged 80, died May 3.

Dr. Charles Hugh Wilcox, Fitzgerald, aged 63, died May 18 of heart disease.

Dr. William C. Wimberly, Fort Gaines, aged 75, died March 1 of bronchitis and hypertension.

Dr. Luther P. Youmans, Swainsboro, aged 71, died April 8 of influenza and myocarditis.

KENTUCKY

The Rockcastle County Medical Society has been reorganized and the newly elected officers are: Dr. N. M. Garrett, Broadhead, President; Dr. T. A. Griffith, Mt. Vernon, Vice-President; and Dr. Lee Chesnut, Mt. Vernon, Secretary.

An annual Course in Pediatrics was begun April 27 and continued ten weeks at the Children's Free Hospital under the auspices of the Pediatric Department of the University of Louisville School of Medicine. The instructors were Dr. Philip F. Barbour, Dr. James W. Bruce, Dr. Lee Palmer, Dr. William W. Nicholson, Dr. James H. Pritchett, Dr. Jacob J. Glaboff, Dr. Harry S. Andrews, Dr. Aaron A. Shapero, Dr. Annie S. Veech and Dr. Margaret A. Limper. Similar courses have been given for several years under the chairmanship of Dr. Barbour.

Dr. A. T. McCormick, Louisville, is a member of the Executive Committee of the State and Territorial Health Officers and State and Provincial Health Authorities, having been elected at their meeting held in Washington in April.

Dr. Irvin Abell, Louisville, was elected as one of the Vice-Presidents of the American Gastro-Enterological Association, held recently.

Dr. Elias S. Frey and Miss Elizabeth Belle Ferguson, both of Louisville, were married April 7.

DEATHS

Dr. William Curtis Caywood, Winchester, aged 60, died April 13 of cerebral hemorrhage.

Dr. Owen Breckenridge Demaree, Frankfort, aged 70, died April 10 of bronchopneumonia.

Dr. Jack Tipton Cottrell, Catlettsburg, aged 38, died April 1.

Dr. Charles Atwood Menefee, Covington, aged 69, died suddenly April 18 of cerebral hemorrhage and hypertensive cardiovascular disease.

Dr. William K. Richardson, Tomkinsville, aged 88, died March 10.

Dr. John Mason Williams, Paris, aged 67, died March 12 of coronary sclerosis.

Dr. Robert Squair Noland, Nicholasville, aged 28, died March 23.

LOUISIANA

The Louisiana Chapter of the National Gastroenterological Society has elected Dr. A. L. Levin, President; Dr. Donovan Browne, Vice-President; and Dr. Percy Querens, Secretary-Treasurer, all of New Orleans.

The Faculty Club of Louisiana State University School of Medicine has elected Dr. Peter Graffagnino, President; Dr. Edgar Hull, Vice-President; and Dr. Frederick F. Boyce, Secretary-Treasurer, all of New Orleans.

The Charity Hospital, New Orleans, has received a check for $1,140 for two new resuscitators and a suction pressure therapy unit, this being the gift of organized labor.

The Touro Infirmary, New Orleans, has received a gift of $60,000 from Mrs. Norman Mayer for the construction of an internes' home in memory of her husband who was interested in the development of this hospital.

The French Hospital, New Orleans, is opening a third floor to be used for a new obstetrical and pediatric department.

Dr. Edwin Socola has been appointed Clinical Professor and Dr. Athol Stewart Kenney Assistant Professor in the Department of Pediatrics at the Louisiana State University School of Medicine, New Orleans.

Dr. Francis L. Jaubert has been reelected President of the

Continued on page 30

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Louisiana Society for Crippled Children and Dr. Guy A. Caldwell, Second Vice-President, both of New Orleans.

The honorary degree of Doctor of Laws has been conferred by Tulane University upon Dr. John B. Elliott, New Orleans.

Dr. Theodore J. Dimitry, New Orleans, has been appointed Chairman of a monument committee to develop New Orleans as a city of monuments. It is planned to make Tulane Avenue the medical avenue of New Orleans.

Dr. J. Ross Veal, New Orleans, accepted the position of Chief Resident Surgeon at the Gallagher Memorial Hospital in Washington, D. C., effective July 1. This position carries teaching connections at George Washington University and Georgetown University Schools of Medicine.

Dr. George M. Decherd, New Orleans, has resigned from the Department of Medicine of Louisiana State University and will return to the University of Texas School of Medicine, Galveston.

Dr. Willard R. Wirth, New Orleans, was received into Fellowship of the American College of Physicians at its recent annual meeting.

Dr. Victor Smith and Dr. W. B. Clark, New Orleans, announce that Dr. Wallace C. Beil, of Kansas City, Missouri, will be associated with them. Dr. Beil has been appointed to the Visiting Staff of the Eye, Ear, Nose and Throat Hospital.

Assistant Surgeon Dale C. Cameron has been relieved at Evansville, Indiana, and ordered to proceed to New Orleans and report to the Medical Officer in Charge of the U. S. Marine Hospital for duty.

Passed Assistant Surgeon Paul E. Walker has been relieved from duty at New Orleans and ordered to report for duty to the Medical Officer in Charge of the U. S. Marine Hospital at Mobile, Alabama.

Dr. George A. Mayer represented the Tulane University School of Medicine at a five-day meeting of the International Congress of Gynecologists and Obstetricians held in Amsterdam in May.

Dr. A. J. Hockett, New Orleans, was recently elected President of the Louisiana State Hospital Association.

Dr. Hugh Page Newbill, former Neuropathologist of the University of Virginia, Charlottesville, Virginia, has been appointed to the faculty of the School of Medicine, Louisiana State University, New Orleans.

Dr. J. O. Weilbaecher, Jr., New Orleans, was made an Associate, and Dr. G. M. Decherd, Jr., New Orleans, a Fellow of the American College of Physicians at their meeting in April.

Dr. Henry G. Butker, New Orleans, is now located at 1201 Canal Bank Building.

Dr. M. M. Goldberg has moved from Pere Marquette Building to 2701 Peniston Street, New Orleans.

Dr. C. V. Perrier, New Orleans, is now located at 1201 Canal Bank Building.

Dr. L. L. Cazenavette, New Orleans, has moved from the Pere Marquette Building to the Maison Blanche Building.

Dr. E. Borland Gill, St. Algiers, has moved to Sebring, Florida.

DEATHS

Dr. Howard Patrick Doles, Mooringsport, aged 51, died April 5 of general peritonitis and ruptured duodenal ulcer.

Dr. Henry Nicholas Harper, Rushton, aged 58, died April 3 of injuries received in an automobile accident.

Dr. Charles Fisher Howell, DeQuincy, aged 66, died March 21.

Dr. Henry Surville Holloman, Olla, aged 59, died April 12 of cerebral thrombosis.

Dr. J. Webb McGehee, Baton Rouge, aged 62, died March 8 of angina pectoris.

Dr. Sidney LeGrand Williams, Shreveport, aged 61, died April 9.

MARYLAND

The Medical and Chirurgical Faculty of Maryland at its recent annual meeting elected Dr. Dean Lewis, Baltimore, President; Dr. Victor F. Cullen, State Sanatorium, Dr. Frederic V. Beitler, Baltimore, and Dr. William D. Noble, Easton, Vice-Presidents; and Dr. Walter D. Wise, Baltimore, Secretary, re-elected. The next annual meeting will be held at Baltimore, April 25-26, 1939.

A new four-story wing to cost about $330,000 is being added to the Hospital for Women at Baltimore, which will increase the capacity from ninety-five to one hundred and twenty beds for adults.

A new $320,000 addition is being added to the Negro branch

Continued on page 32

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1. "Treatment of Human Pellagra with Nicotinic Acid"—Fouts, Helmer, Lepkovsky and Jukes; Proc. Soc. Exp. Biol. & Med.; 37:405: (Nov.) 1937.
2. "Relation of Nicotinic Acid and Nicotinic Acid Amide to 'Canine Blacktongue' "—Elvehjem, Madden, Strong and Wooley; Jrl. Amer. Chem. Soc. 59:1767: (Sept.) 1937.
3. "Therapeutic Administration of Nicotinic Acid, in Human Beings During Health and Disease,"—Spies, Cooper and Blankenhorn. (Read before the Central Society for Clinical Research, Chicago—Nov. 1937.)
4. "Nicotinic Acid and the Pellagra Preventing ('P-P') Vitamin"—Harris; Chem. & Ind.; 56:1134: (Dec.) 1937.
5. "Pellagra Successfully Treated with Nicotinic Acid—A Case Report."—Smith, D. T., M.D.; Ruffin, Julian M., M.D.; and Smith; Susan Cower, M.A.; Jrl. A.M.A. 109:2054: (Dec. 18) 1937.
6. "Nicotinic Acid and Vitamin B_2" — Dann, W. J.; Science; 86:616: (Dec. 31) 1937.
7. "Pellagra and Nicotinic Acid" An Editorial — Jrl. A.M.A. 110-289 (Jan. 22) 1938.
8. "Relation of Nicotinic Acid to Human Pellagra," an editorial, Jrl. A.M.A., 109:1203:1937 (Oct. 9).
9. "The Use of Nicotinic Acid in the Treatment of Pellagra,"—Spies, Cooper and Blankenhorn; Jrl. A.M.A. 110:622:1938 (Feb. 26).
10. "Advances in the Treatment of Pellagra."—Editorial, Annals of Internal Medicine 11:1760 (March) 1938.
11. "A Note on the Relationship of Porphyrinuria to Human Pellagra." Tom Douglas Spies, M.D., Yasuo Sasaki, Ph.D., and Esther Gross, M.S., Southern Medical Journal, Vol. 31, No. 5, May, 1938. Page 483.

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Continued from page 30

of the Maryland Tuberculosis Sanatorium, Henryton, which will give an increase of 250 beds.

A new $750,000 research building of the National Cancer Institute, Bethesda, will be completed within a year.

Dr. Henry E. Sigerist, Baltimore, was elected Secretary of the American Association of the History of Medicine at its annual meeting held in May.

Dr. Ernest H. Gaither, Baltimore, was elected President of the American Gastro-Enterological Association at its recent meeting.

Dr. Kenneth F. Maxcy has resigned as Professor and Head of the Department of Bacteriology at Johns Hopkins University School of Hygiene and Public Health to become Professor and Head of the Department of Epidemiology.

DEATHS

Dr. Newell Cutler Bullard, Cambridge, aged 64, died April 20 of cerebral hemorrhage.

Dr. James Valentine Clarken, Baltimore, aged 51, died April 17 of coronary thrombosis.

Dr. Franklin Pierce Herr, Ridgely, aged 86, died March 18 of chronic interstitial nephritis.

Dr. James T. Johnson, Cumberland, aged 69, died April 1.

Dr. Duncan MacCalman, Baltimore, aged 73, died March 14 of carcinoma of the colon.

Dr. John David Nicodemus, Walkersville, aged 83, died in April of cardiovascular renal disease and bronchopneumonia.

Dr. Nathan Ryno Smith, Baltimore, aged 74, died March 30 of erysipelas.

MISSISSIPPI

The Louisiana-Mississippi Ophthalmological and Otolaryngological Society at its meeting held in New Orleans in April elected Dr. Francis LeJeune, New Orleans, Louisiana, President; Dr. D. C. Montgomery, Greenville, Vice-President; and Dr. Edley H. Jones, Vicksburg, Secretary-Treasurer. The next meeting will be held at Gulfport on Monday preceding the Mississippi State Medical Association meeting of 1939.

The newly elected officers of the Hospital Service Corporation of Mississippi are: Dr. A. Street, Vicksburg, President; Dr. J. Gould Gardner, Columbia, Vice-President; Dr. Leon S. Lippincott, Vicksburg, Secretary; and Dr. J. P. Wall, Jackson, Treasurer.

An effort is being made by the physicians of Washington County and the Beppo Arnold Post of the American Legion, acting through the local and State Park Commissions, with the cooperation of the State Planning Commission, to develop the warm springs of Percy Park near Hollandale as a health resort.

The syphilis clinic at Greenville has moved into new quarters, a recently erected building provided by the Washington County Board of Commissioners. Six doctors alternating by two's in the conduct of the clinic are: Dr. C. T. Berry, Dr. J. W. Williams, Dr. A. V. Murry, Dr. E. L. Fuller, Dr. G. W. Peterson, and Dr. R. N. Crockett.

Dr. T. E. White, Greenville, won the scientific exhibit award at the Mississippi State Medical Association meeting held in Jackson recently.

Effective May 1, Dr. Henry C. Ricks was appointed Director of the State Hygienic Laboratory, Jackson, following the retirement of Dr. Theodore W. Kemmerer. Dr. Ricks has been for ten years Director of County Health Work of the State Department of Health, Jackson. Dr. John A. Milne will succeed Dr. Ricks as Director of County Health Work.

Dr. J. W. Dugger, Jackson, Director of Industrial Hygiene and Factory Inspection, completed during April an inspection tour of eighty-four factories employing women and children, the inspection being for safety, sanitation, ventilation, lighting, etc.

Dr. John W. Shackelford, Director of the Washington County Health Department for eight years, has resigned to become Director of the Technical Field Unit and serve as Advisory Officer for health units with the Oklahoma State Department of Health, beginning his new work August 15. He will be succeeded as County Health Officer by Dr. George W. Mast, Lexington.

Dr. Charles Torbert Berry, Greenville, and Miss Berry Stevens, Senatobia, were married April 28.

DEATHS

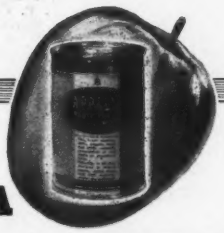
Dr. R. M. Adams, Ripley, aged 65, died recently.

Dr. William F. Ashley, Shaw, aged 72, died March 22 of cardiorenal disease.

Dr. James S. Evans, Houston, aged 81, died in April of arteriosclerosis.

Continued on page 34

Even RESISTANT DIARRHEA RESPONDS



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*Manville, Ira A.: Use of Apple Powder in the Prevention and Cure of Summer Diarrheas, Arch. Pediat. 55:76 (Feb.) 1938.

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Continued from page 32

Dr. Malcolm A. McEachern, Carrollton, aged 66, died recently.

Dr. George R. Robertson, Fair River, aged 93, died April 15 of arteriosclerosis.

Dr. William Carl Seale, Catchings, aged 45, died March 30.

MISSOURI

St. Francois-Iron-Madison-Washington-Reynolds County Medical Society has elected Dr. C. H. Appleberry, Flat River, President; Dr. J. L. Thurman, Potosi, Vice-President; and Dr. P. L. Jones, Flat River, Secretary and Treasurer.

The Missouri Chapter for the Advancement of Gastroenterology, at its recent annual meeting, elected Dr. Frank D. Gorham, St. Louis, President; Dr. W. J. Siebert, St. Louis, Vice-President; Dr. L. P. Gay, St. Louis, Treasurer; and Dr. H. L. Joslyn, St. Louis, Secretary.

Dr. R. B. Schutz, Kansas City, was presented an award by the Committee on Maternal Welfare for the most appropriate article appearing in the State Journal during the year relating to obstetrical care.

Dr. Avery P. Rowlette, St. Louis, received the annual award of the Young Men's Division of the St. Louis Chamber of Commerce for performing the most outstanding civic service during the preceding year. Dr. Rowlette is Medical Director of the St. Louis City Hospital.

Dr. Albert Casey, Associate of Pathology and Chairman of the Department, St. Louis University School of Medicine, St. Louis, has been appointed Assistant Professor in the Department of Pathology and Bacteriology at Louisiana State University School of Medicine, New Orleans, Louisiana.

Dr. Hugh McCulloch, St. Louis, was reelected Secretary of the American Pediatric Society at its semicentennial meeting held in Great Barrington, Massachusetts, in May.

Dr. Frank R. Teachenor, Kansas City, was elected Vice-President of the Harvey Cushing Society at its recent annual meeting in Memphis, Tennessee.

DEATHS

Dr. Alphonsus J. Engel, St. Louis, aged 68, died April 18 of carcinoma of the pancreas.

Dr. James Elijah Neely, Kansas City, aged 64, died April 11.

Dr. Ernest H. Spooner, St. Louis, aged 74, died April 20 of arteriosclerotic heart disease.

Dr. William Sherman Thomas, Kansas City, aged 73, died March 2 of pneumonia.

Continued on page 36

Classified Advertisements

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Contiued from page 34

Dr. William Alexander Welch, Callao, aged 65, died March 23 of an infection of the gallbladder.

Dr. Henry Elden Willdis, Cleveland, aged 26, died March 1 of bronchopneumonia.

Dr. Brickhouse Wilson, Independence, aged 44, died April 4 of coronary heart disease.

Dr. William Lee Winn, Columbia, aged 68, died March 13 of coronary thrombosis.

Dr. Cook Bar Young, Kansas City, aged 70, died March 13 of chronic myocarditis and hypertension.

NORTH CAROLINA

The annual Southern Pediatric Seminar is being held at Saluda for two weeks, having begun July 25. This is a postgraduate course in the methods of diagnosis, prevention and treatment of diseases of children. Many prominent physicians throughout the South appear on the program.

The Granville Hospital, Oxford, was opened recently with a capacity of forty-five beds. It replaces the old Brantwood Hospital.

A medical library is being established at Grace Hospital, Banners Elk, this in memory of the late Dr. Ronda H. Hardin, who was a member of the staff for many years.

Dr. George M. Cooper, Assistant State Health Officer since 1923, and Director of the Division of Preventive Medicine and Health Education, Raleigh, was recently presented with a gift in recognition of his service with the State Board for twenty-three years.

Dr. George Boyce Lynch, Brevard, has been appointed Health Officer of Transylvania County.

Dr. James Street Brewer, Roseboro, has been appointed a member of the State Board of Medical Examiners.

Dr. Harry L. Johnson, Hickory, was elected President of the North Carolina Hospital Association at its recent annual meeting.

Dr. William Smith Tillet, a native of Charlotte, has been appointed Professor of Medicine in the New York University College of Medicine.

Dr. James B. Murphy, a native of Morganton, recently had the degree of Doctor of Science conferred upon him by the Oglethorpe University. He previously received such awards from the University of North Carolina and the University of Louvain.

Dr. Wingate Memory Johnson, Winston-Salem, has been elected President of the Board of Trustees of Wake Forest College.

Dr. John McCampbell, Superintendent of the State Hospital at Morganton for thirty years, has resigned from the position and has been succeeded by Dr. Fonso B. Watkins, First Assistant Physician for twenty-six years. Dr. Roy H. Long, a member of the Medical Staff, has been appointed to succeed Dr. Watkins.

Dr. William Larkin Norville, Whitmire, and Miss Lillie Mae Freeman, Rutherfordton, were married recently.

Dr. Maurice M. Rosenbaum, Shallotte, and Miss Kitty Matthias, Wilmington, were married May 2.

Dr. Joseph Halford Patterson, Broadway, and Miss Gaynelle Seawell, Greensboro, were married March 5.

Dr. Philip Grover Padgett, Bryson City, and Miss Charlene Cooper, Galveston, Texas, were married April 2.

Dr. Wayland Nash McKenzie, Albemarle, and Miss Alice Katherine Lacy, Richmond, Virginia, were married in April.

Dr. Millard Bainbridge Bethel and Miss Elizabeth Newell Roach were married in Statesville May 10.

Dr. John Milton Barrett, Greenville, and Miss Florence Elizabeth Schwarz, Lancaster, Pennsylvania, were married in Baltimore April 27.

Deaths

Dr. T. J. Bullock, Autryville, aged 75, died May 26.

Dr. Bruce Council, Apex, aged 23, died recently.

Dr. William O. Patton, Robbinsville, aged 77, died March 6 of cerebral hemorrhage.

Dr. Harry Hall Wilson, Black Mountain, aged 64, died April 4.

Dr. A. D. N. Whitley, Monroe, aged 63, died May 30.

OKLAHOMA

A new building for biological sciences was recently dedicated at the University of Oklahoma, this being made possible by a PWA grant of $204,000, and $47,000 given by the state legislature for the equipment.

The library of the late Dr. Garabed A. Z. Garabedian was recently presented to the Tulsa County Medical Society by Mrs. Garabedian, the collection on pediatrics serving as a memorial to Dr. Garabedian.

Dr. George H. Stagner's hospital at Erick was destroyed by fire on May 8 while he was attending the State Medical meeting.

Dr. Merle Clift, Blackwell, is spending three months doing postgraduate work in surgery at the University of Edinburgh, Scotland.

The Oklahoma City Clinical Society announces that it will meet with the Southern Medical Association in Oklahoma City, November 15-18 inclusive. In the fall of 1939 the Oklahoma City Clinical Society will continue its regular annual sessions.

Dr. E. A. Canada, Ada, has been appointed on the surgical service of Bellevue Hospital in New York City for a period of several months.

Dr. W. J. Whitaker, Pryor, has been doing postgraduate work at the Rochester Clinic, Rochester, Minnesota.

Dr. L. B. Woods, Ardmore, has completed a postgraduate course in obstetrics and gynecology at the New York Polyclinic Medical School and Hospital.

Deaths

Dr. Carl Lorraine McCallum, Sapulpa, aged 59, died in March of septicemia.

Dr. James M. McPherson, Terral, aged 78, died April 29.

Dr. James C. Reynolds, Frederick, aged 57, died May 14.

SOUTH CAROLINA

The Providence Hospital, Columbia, was formally dedicated June 16. This is a new 120-bed institution for the accommoda-

Continued on page 38

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Continued from page 36

tion of white patients and is of fire-proof construction and modern in every detail.

Dr. James A. Hayne, Columbia, has been elected Executive Secretary of the State Board of Health for the twenty-seventh consecutive time.

Dr. Ernest Cooper and Dr. Leo F. Hall, State Park, were honored by being made Fellows of the American College of Chest Physicians.

The Association of Surgeons of the Southern Railway elected Dr. W. H. Frampton, Charleston, President; Dr. J. F. Abel, Waynesville, North Carolina, first Vice-President; and Dr. W. P. Timmerman, Batesburg, fourth Vice-President.

Dr. George St. Clair Rhame, Camden, and Miss Martha Louise Daniel were married June 25.

Dr. James Dudley Whitehead and Miss Maria Weaver, both of Lake City, were married in April.

DEATHS

Dr. Joseph A. Anderson, Antreville, aged 76, died April 10.

Dr. William G. Blackwell, McCormick, aged 60, died April 10.

Dr. James L. Bolt, Easley, aged 65, died April 11 of coronary thrombosis.

Dr. Edward Frost Parker, Charleston, aged 70, died March 28 of cerebral arteriosclerosis and chronic myocarditis.

Dr. Samuel M. Pitts, Saluda, aged 75, died March 31 of coronary thrombosis.

Dr. James O. Rosamond, Easley, aged 73, died April 23.

Dr. John William Augustus Sanders, Lugoff, aged 61, died April 22 of acute coronary occlusion.

Dr. David H. Montgomery, Union, aged 69, died April 22 of intestinal obstruction.

TENNESSEE

The West Tennessee Medical and Surgical Association has elected Dr. John Jackson, Dyer, President; Dr. C. E. Bolen, Wildersville, Vice-President; Dr. Roy Douglass, Huntingdon, Vice-President; Dr. George R. McSwain, Paris, Secretary; and Dr. W. O. Baird, Henderson, Assistant Secretary.

The Middle Tennessee Medical Association has elected Dr. D. F. Smith, Nashville, President; Dr. Sam Fentress, Goodlettsville, Vice-President; and Dr. Fowler Hollabaugh, Nashville, Secretary.

The Upper Cumberland Medical Society has elected Dr. Thurman Shipley, Cookeville, President; Dr. H. C. Hesson, Red Boiling Springs, First Vice-President; Dr. Fred Terry, Cookeville, Second Vice-President; Dr. Lillard Sloan, Carthage, Third Vice-President; and Dr. L. M. Freeman, Granville, Secretary-Treasurer.

Dr. Tinsley R. Harrison, Nashville, was elected President of the American Society for Clinical Investigation at its recent annual meeting.

Dr. John J. Mullowney announced his retirement, effective July 1, as Professor of Public Health and President of Meharry Medical College, Nashville. He will be succeeded by Dr. Edward L. Turner, Professor of Medicine.

The members of the faculty of Vanderbilt University School of Medicine, Nashville, recently honored Dr. G. Canby Robinson, Baltimore, Maryland, with a dinner. Dr. Robinson served as Dean of Vanderblit from 1921 to 1929.

Dr. James C. Kelton, Lascassas, and Mrs. Anna Davis King, Nashville, were married March 2.

Dr. Homer David Hickey and Miss Marguerite Eilene Bacon, both of Chattanooga, were married recently.

Dr. Edwin M. Stevenson and Miss Mabel Dean, both of Memphis, were married April 5.

Dr. Bert Truman Brundadge, Nashville, and Miss Mary Jo Page, McMinnville, were married in February.

DEATHS

Dr. L. O. Bialock, Knoxville, aged 62, died April 7 of diabetes mellitus.

Dr. B. E. Delozier, Maryville, aged 57, died May 9.

Dr. John W. Drinnen, Riverdale, aged 72, died April 7 of coronary occlusion.

Dr. Joseph F. Campbell, Morristown, aged 70, died April 1 of pneumonia.

Dr. Clyde Crawford Hardison, Iron City, aged 49, died April 14.

Dr. Carp Sanders Kinzer, Johnson City, aged 62, died April 2 of embolus.

Dr. Needham Kahn Moody, Memphis, aged 49, died April 18 of pneumonia.

Dr. James B. Smith, Dunlap, aged 65, died March 28 of tuberculosis of the kidneys.

TEXAS

The Texas State Medical Association installed Dr. Ernst W. Bertner, Houston, as President; and elected Dr. Leopold H. Reeves, Fort Worth, President-Elect; Dr. Lewis B. Holland, Wichita Falls, Dr. James W. Ward, Greenville, and Dr. Frederick B. Shields, Victoria, Vice-Presidents; Dr. Holman Taylor, Fort Worth, Secretary, reelected; and Dr. Khleber H. Beall, Fort Worth, Treasurer, reelected. The 1939 session will be held in San Antonio, May 8-11.

The Texas Neurological Society elected Dr. C. H. Standifer, Austin, President; Dr. T. H. Cheavens, Dallas, Vice-President; and Dr. Wilmer L. Allison, Fort Worth, Secretary-Treasurer, reelected.

The Texas Dermatological Society elected Dr. Everett Seale, Houston, President; Dr. Ben Eppright, Austin, Vice-President; and Dr. Duncan O. Poth, San Antonio, Secretary.

The Texas Orthopedic Society elected Dr. Joe B. Foster, Houston, President; and Dr. E. M. Cowart, Houston, Secretary.

The Texas Pediatric Society elected Dr. F. O. Calaway, Houston, President; Dr. T. A. Tumbleson, Beaumont, Vice-President; and Dr. F. H. Lancaster, Houston, Secretary-Treasurer, reelected.

The Texas Association of Medical Anesthetists elected Dr. George H. Paschal, San Antonio, President; Dr. H. T. Safford, El Paso, Vice-President; and Dr. R. A. Miller, San Antonio, Secretary-Treasurer.

The Texas Society for Mental Hygiene elected Dr. A. Hauser,

Continued on page 40

To Assure Quick Dependable Response
Discriminating Physicians are Prescribing
the easily soluble

ACCEPTED AMERICAN MEDICAL ASSN.

DUBIN AMINOPHYLLIN
THEOPHYLLINE-ETHYLENEDIAMINE

American Made from American Materials

H.E.DUBIN LABORATORIES
INCORPORATED
250 E. 43rd St. New York, N.Y.

VEGEX
FOR THE B VITAMIN COMPLEX

For the B Complex in Medicine and Nutrition

VEGEX-VITAFOOD DRIED BREWERS' YEAST

Vegex-Vitafood Dried Brewers' Yeast stands at the top in vitamin B complex potency —all of the known B vitamins, including 40 International B_1 units, 40 plus Sherman-Bourquin B_2 units and 3 plus units of the full growth factor per gram which only the B complex in its entirety can supply. Extensive clinical use shows it high and uniformly dependable in the P-P (pellagra preventive) factor designated, in honor of Dr. Goldberger, as "G".

While the blacktongue test is, partially, a presumptive one for the P-P (pellagra preventive) factor, G, the only real test is the physician's use in pellagra treatment.

More than fifty million doses of Vegex-Vitafood Dried Brewers' Yeast have been used by physicians and health departments, throughout the South, with no reports other than a veritable wealth of positive, satisfactory clinical results.

There are two brands of this yeast—the Red Label (more palatable) and the Green Label (straight) equally potent and more economical. For general physician's use, the Red Label is recommended. Both are sold at a price which gives retailers and jobbers their established trade discount and then leaves something in the patient's pocketbook to pay for the needed diagnosis and other treatment.

VEGEX-AUTOLYZED BREWERS' YEAST EXTRACT

Vegex extracts the B vitamins and minerals from the brewers' yeast into more available form. The autolyzing process gives the yeast proteins a tasty meat-like flavor. The Vegex process either concentrates from the yeast or develops the extrinsic factor (anemia). There are now fifty-six reports from medical centers showing the value of Vegex in anemias; particularly in macrocytic and pernicious anemias. Physicians report Vegex a distinct aid to the liver extract treatment. Sturgis, Wills, Vaughan and others used it successfully without liver extract. We have been conservative about this; just pass the facts on to the practitioner.

Vegex was the pioneer product used in the mass treatment of beriberi during the World War; was selected to find the relation of the B vitamins to child growth; the promotion of lactation; in the pioneer studies in gastro-enterology; in disorders relating to diabetes. Being carbohydrate free, it is valuable in carbohydrate restricted diets.

Milk, for example, is low in some of the B vitamins and in iron. Vegex splendidly supplements milk for child feeding. With Vegex children generally drink more milk.

ANOREXIA — STRENGTH AID

In general use, it is now known that the B vitamin complex stimulates appetite, and aids the physician in getting a strength response from the patient. There has been much reported use in post-operative liquid diets.

Samples for clinical or physician's personal use sent on request. No sampling except when requested.

VITAMIN FOOD CO., INC. VEGEX, INCORPORATED
122 Hudson Street, New York, N. Y.

Continued from page 38

Houston, President; Dr. T. W. Buford, Minter, First Vice-President; Dr. H. L. Pritchett, Dallas, Second Vice-President; Dr. James S. Allen, Austin, Secretary; and Dr. Wilmer Allison, Fort Worth, Treasurer.

The Texas Railway Surgeons Association elected Dr. D. W. Carter, Dallas, President; Dr. W. W. Bondurant, San Antonio, Vice-President; Dr. V. E. Schulze, San Angelo, Secretary.

Milam County Medical Society has elected Dr. C. G. Swift, Cameron, President; Dr. Thomas S. Barkley, Rockdale, Vice-President; and Dr. C. G. Brindley, Cameron, Secretary.

Dr. W. D. Seybold has been appointed Instructor in the Department of Anatomy at the State Medical College, Galveston, to succeed Dr. Curtis W. Burge, who resigned.

Dr. Charles T. Stone, Galveston, was elected Third Vice-President of the American College of Physicians at their recent meeting in New York.

Dr. Dolph L. Curb and Dr. L. W. Sheckles, Galveston, were elected to associate membership in the American College of Physicians.

The Wellington Hospital, for many years owned and operated by Dr. Elmer W. Jones, has been given to the Sisters of St. Dominic.

The Fleming Hospital, Elgin, built by Dr. Joe V. Fleming at a cost with equipment of approximately $45,000, recently held its formal opening.

Dr. Arthur P. Black, El Paso, has been elected Fellow of the American Association for the Advancement of Science.

Dr. Leslie Smith, El Paso, has been elected a Fellow of the American Academy of Dermatology and Syphilology.

Dr. Harry A. Logsdon has moved from Ranger to Colorado.

Dr. A. T. Rhoads, Corsicana, has been doing postgraduate work in Kansas City, Missouri.

Dr. Lee Edward Parmley, Big Spring, and Miss Thelma Lowery, Winter Haven, Florida, were married February 24.

Deaths

Dr. N. H. Bickley, Stamford, aged 74, died April 17 of cerebral thrombosis.

Dr. Whitfield W. Harral, Dallas, aged 67, died April 12.

Dr. Taylor Hudson, Belton, aged 83, died April 24.

Dr. E. M. Jenkins, Hillsboro, aged 70, died March 27 of malignancy of the stomach and hip.

Dr. I. N. Mayfield, Giddings, aged 81, died April 12.

Dr. James Harris Hicks, Denton, aged 63, died April 6 of heart disease.

Dr. Edmund B. Parsons, Palestine, aged 73, died March 13 of carcinoma of the sigmoid.

Dr. Luther F. Rhodes, Fort Worth, aged 61, died March 29 of pulmonary tuberculosis.

Dr. Samuel I. Sturges, Azle, aged 68, died March 21 of cerebral hemorrhage.

VIRGINIA

The Journal regrets that the new officers of the Roanoke Academy of Medicine were incorrectly given in the July issue. They should be: Dr. W. W. S. Butler, President; Dr. L. G. Richards and Dr. C. A. Young, Vice-Presidents; and Dr. A. C. Davis, Secretary-Treasurer, all of Roanoke.

Norfolk County Medical Society has elected Dr. William B. Newcomb, President; Dr. Harvie S. Baker, President-Elect; Dr. Benjamin A. Doggett, Vice-President; and Dr. Lockburn B. Scott, Secretary-Treasurer, reelected, all of Norfolk.

Charlotte County Medical Society has elected Dr. C. M. Nicholson, Charlotte C. H., President; Dr. J. B. Bailey, Keysville, Vice-President; and Dr. R. B. Cralle, Drakes Branch, Secretary.

Hanover County Medical Society has elected Dr. Hawes Campbell, Jr., Hanover, President; Dr. Edwin Vaughan, Ashland, Vice-President; and Dr. Frank L. Hughes, Ashland, Secretary-Treasurer.

The Fourth District Medical Society has elected Dr. C. V. Montgomery, South Hill, President; Dr. C. G. O'Brien, Appomattox, and Dr. N. P. Snead, Cartersville, Vice-Presidents; and Dr. C. E. Martin, Emporia, Secretary-Treasurer, reelected.

The Staunton Academy of Medicine has elected Dr. Joseph Alexander, President; Dr. Guy R. Fisher, Vice-President; and Dr. Charles W. Putney, Secretary-Treasurer, all of Staunton.

The Mental Hygiene Society of Virginia has elected Dr. Howard R. Masters, Richmond, President.

Continued on page 42

BUFFERED ALKALINIZATION

by the safe, physiological process

WHERE buffered alkalinization is desirable—as during sulfanilamide administration, in the treatment of colds, influenza and other seasonal respiratory affections—Kalak offers these clinical advantages:

(1) It presents a balanced combination of bicarbonates in solution. (2) It contains the mineral substances normal to the blood (and no other).

Kalak's high buffering value helps to maintain the urinary pH of 7.4 which has been found so desirable in sulfanilamide therapy.

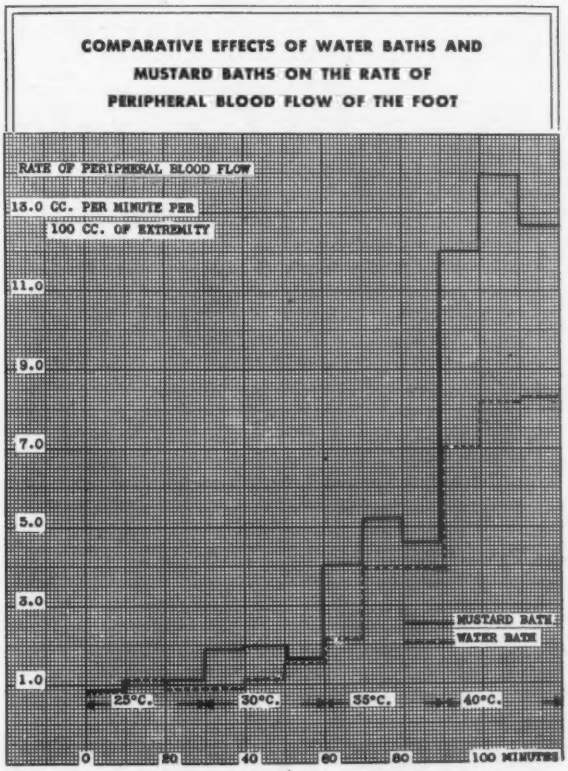
KALAK

is synthetically prepared—is hypertonic, uniform in composition, definite in alkali potency.

KALAK WATER COMPANY OF NEW YORK, INC., 6 CHURCH STREET, NEW YORK CITY

MUSTARD BATHS

—to increase peripheral blood flow



EXPERIMENTS on human subjects now show that the efficacy of the mustard bath in correcting disturbances of peripheral circulation does not depend on the use of excessively hot water or massive amounts of mustard.

The optimum effect of the mustard bath (0.5% to 0.6% solution of mustard in the bath) is obtained in from 10 to 20 minutes at 35° to 40° C., which is approximately body temperature and is from 5° to 8° above skin-surface temperature.

Such a mustard bath, experiments show, increases the rate of peripheral blood flow as much as 74% above the level obtained with the water bath of the same temperature.

Proportions should be: half a pound of mustard to ten gallons of water . . . or to about half the capacity of the average tub. As large a body surface as possible should be exposed to the mustard bath.

Indicated as an aid in correcting disturbances of peripheral circulation. As adjunctive treatment in reducing fevers, in cases of upper respiratory tract infections, in treating exposure to cold or infection. Insomnia, nervous and muscular fatigue.

A copy of recently published results of experimental studies of effects of mustard baths on the peripheral vascular system will be sent to physicians upon request.

Colman's Mustard

Atlantis Sales Corporation, Rochester, New York

Continued from page 40

The Thermal Belt Medical Society, recently organized, has elected Dr. W. C. Bostic, Sr., Forest City, President; and Dr. H. C. Thompson, Shelby, Secretary.

An informal Surgical Club was formed in Norfolk this year and the new officers are: Dr. Charles Lupton, President; Dr. C. J. Devine, Vice-President; and Dr. Allen S. Lloyd, Secretary-Treasurer.

Dr. Oswald Weaver, recently of Charlottesville, has been appointed to the staff of the State Colony for Epileptics and Feebleminded, succeeding Dr. W. V. Kelly.

Dr. J. Gordon Rennie, Richmond, is now associated with Dr. Charles M. Scott at St. Luke's Hospital, Bluefield, West Virginia, in the practice of proctology and surgery.

Dr. M. Pierce Rucker, Richmond, was awarded the degree of Doctor of Laws at the commencement exercises of Randolph Macon College.

Dr. Stuart Michaux and Dr. A. Stephens Graham have entered a partnership for the practice of surgery and gynecology at Stuart Circle Hospital, Richmond.

Dr. James A. Wilkins has been appointed coroner for the City of Lynchburg, succeeding Dr. J. Burton Nowlin, who served in that office for twenty-one years.

Dr. Charles L. Savage has been appointed Director of the Hanover County Health Department with headquarters at Ashland.

Dr. G. R. Carpenter has been appointed Health Officer of the Dickenson-Scott-Wise Health District with headquarters at Norton. He succeeds Dr. J. R. Massie who resigned.

Dr. C. L. Riley has been appointed Health Officer of Prince William County Health Department with headquarters at Manassas, and Dr. William Y. Garrett, Assistant Health Officer.

Dr. Linwood Farley has been reappointed Assistant Health Officer of the Valley Health District with headquarters at Luray.

Dr. M. I. Shanholtz has been reappointed Director of the Washington-Bristol City Health Department with headquarters at Bristol.

Dr. Lonsdale J. Roper, Richmond, has been appointed Director of the Bureau of Rural Health. He was formerly an Associate Director of the Division of Venereal Disease Control.

Dr. Louis Philip Bailey, Nathalie, and Miss Telia Barner Barksdale, Sutherlin, were married June 18.

Dr. James Thomas Tucker, Richmond, and Miss Katharine Vinyard Huff, Roanoke, were married June 15.

Dr. William Stone Burton, Powhatan, and Miss Dorothy Boyd Archer, Petersburg, were married in June.

Dr. Homer Earle Ferguson, Richmond, and Miss Audrey Bryan Tulloh, Mineral, were married June 3.

Dr. James Thomas Gill and Miss Mary Dinwiddie Crow, both of Richmond, were married June 25.

Dr. Waldo Mason Whattles, Farmville, and Miss Lois Wright, Welch, West Virginia, were married June 30.

Dr. Harold W. Kinderman, Wicomico Church, has been appointed Superintendent of Dixie Hospital, Hampton.

Dr. Ennion S. Williams, Richmond, was recently appointed Medical Director of the Life Insurance Company of Virginia, succeeding the late Dr. Charles L. Rudasill.

Dr. Charles Edward Holderby, formerly on the staff of the Eastern State Hospital, announces the opening of his office at Williamsburg for the practice of medicine and surgery.

Deaths

Dr. Paul E. Redd, Richmond, aged 65, died March 27 of myocarditis.

Dr. Jasper N. Walker, Bastian, aged 71, died April 8 of cerebral hemorrhage.

WEST VIRGINIA

Dr. Athey Ragan Lutz, formerly of Huntington, announces the opening of his offices in Parkersburg, with practice limited to orthopedic surgery and fractures.

Deaths

Dr. William Stuart Fulton, Wheeling, aged 65, died May 30.
Dr. Charles Menger Truschel, Wheeling, aged 58, died May 22.
Dr. B. F. Harden, Wellsburg, aged 81, died June 3.

THELESTRIN
OVARIAN FOLLICULAR HORMONE

A standardized preparation of the ovarian follicular hormone for intensive ovarian therapy by hypodermic injection.

Indicated in the treatment of scanty menstrual flow, amenorrhea and the vasomotor and nervous symptoms of the menopause.

Each ampoule contains 25 rat units standardized by the Allen-Doisy method.

Boxes of 6 1-cc. ampoules

• G. W. CARNRICK CO. •

20 Mt. Pleasant Ave. Newark, N. J.

During and After
PREGNANCY . . .

C-G ALKALIZER Effervescent

CONTENTS 8 OUNCES
EMERSON'S
C-G
ALKALIZER
EFFERVESCENT
ZESTFUL-EFFERVESCENT-REFRESHING-
URIC ALKALINITY LASTING FOUR TO SIX HOURS MAY BE INDUCED BY ONE DOSE REPEATED IN HALF HOUR
SIX TEASPOONFULS WILL FURNISH AS MUCH CALCIUM AS IS IN THE AVERAGE DAILY DIET
EMERSON DRUG CO.
BALTIMORE, MD., U.S.A.

Rallies ALKALI

to restore alkali to blood for better resistance to colds and other ailments, to minimize nausea and vomiting, help prevent edema and renal disease.

and CALCIUM Forces

to help fight against calcium depletion and thus guard teeth and bones, promote lactation, decrease nervous irritability.

The snow-white granules of C-G Alkalizer give a zestful, effervescent drink. Not a laxative or local antacid, C-G Alkalizer promotes elimination through intestines, kidneys and skin, and stimulates gastric function. Its calcium gluconate is probably the most easily-assimilable in the materia medica. Its sodium citrate alkalizes physiologically, with the efficiency of the citrus fruits.

EMERSON DRUG COMPANY

BALTIMORE MARYLAND

FULL-SIZE PACKAGE FREE

EMERSON DRUG CO.
Baltimore Maryland

Please send me FREE a full-size market package of Emerson's C-G Alkalizer.

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SM-8

Are the Neuritic Symptoms of Pregnancy *due to a deficiency of vitamins B_1 and G?*

SUCH common neuritic symptoms of pregnancy as pains in arms and legs, muscle weakness, and (less frequent but more serious) paralysis of the extremities may result from a shortage of antineuritic vitamins, recent investigations appear to show. Although neuronitis of pregnancy has long been considered a toxemia, no toxins have ever been identified.

Clinical observations of Strauss and McDonald lead to the conclusion that the condition is a dietary deficiency disorder similar to beriberi, caused by lack of vitamin B_1, complicated by symptoms which may be traced to shortage of vitamin G. They report recovery in their cases receiving this therapy, including dried brewers' yeast.

Hyperemesis as Cause of Avitaminosis

Wechsler observes that all cases of polyneuritis of pregnancy recorded in the literature were preceded by long periods of severe vomiting. "It would seem," he adds, "that because of actual starvation these patients suffered from avitaminosis and consequent neuritis," a view likewise held by Hirst, Luikart, and Gustafson. Plass and Mengert observe that the practice of giving high carbohydrate feedings for hyperemesis gravidarum is still more likely to cause avitaminoses B and G.

Dried brewers' yeast, as it is far richer than any other food in vitamins B_1 and G, is being used with benefit both in the prevention and treatment of polyneuritic symptoms of pregnancy. Lewy found that additions of yeast to the diet reduced electric irritability of the peripheral nerves and brought clinical improvement. Vorhaus states that he and his associates, after administering large amounts of vitamin B_1 to 250 patients having various types of neuritis, including that of pregnancy, observed in about 90% of cases "varying degrees of improvement, i.e., from partial relief of pain to complete disappearance of all symptoms."

Need for Vitamins B and G in Lactation

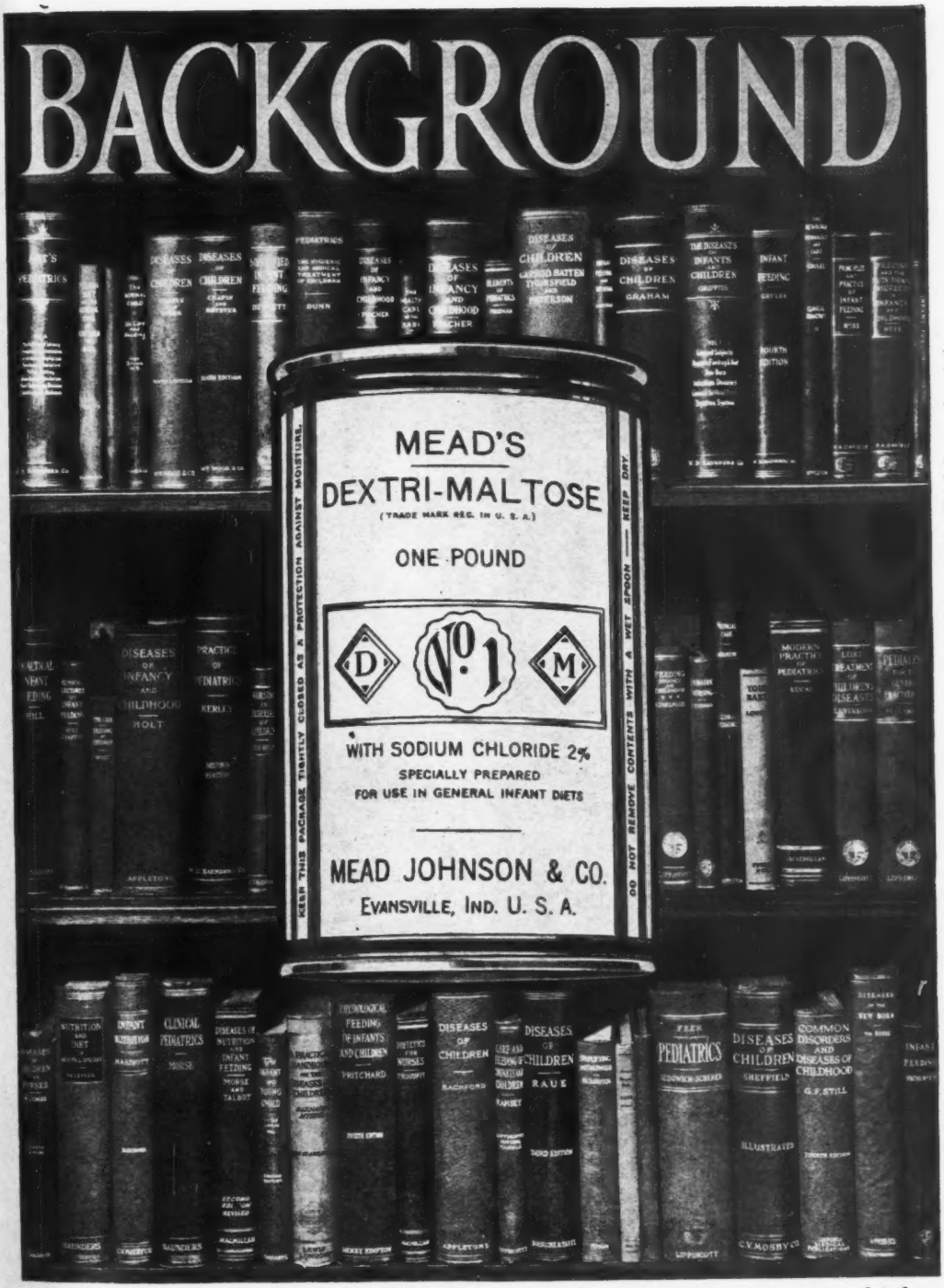
Evans and Burr, Hartwell, Sure and co-workers, and Macy *et al* are among numerous authorities who find that the nursing mother also needs supplements of vitamins B_1 and G, from 3 to 5 times the normal requirement. Tarr and McNeile report that the physical, mental, and emotional status of 120 pregnant and lactating women receiving Mead's Brewers Yeast and other foods high in vitamin B was superior to that of a control group of 116 women.

Since the management of polyneuritis of pregnancy is difficult at best, it would appear logical to supply those dietary substances which may safeguard against it. One of the richest and most convenient sources of the anti-neuritic factors, vitamins B_1 and G, is Mead's Brewers Yeast Tablets. Consisting of nonviable yeast, they offer not less than 25 International vitamin B_1 units and 42 Sherman vitamin G units per gram.

Supplied in bottles of 250 and 1,000 tablets, also in 6-oz. bottles of powder.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.

Mead Johnson & Company, Evansville, Indiana, U. S. A.



THE use of cow's milk, water and carbohydrate mixtures represents the one system of infant feeding that consistently, for three decades, has received universal pediatric recognition. No carbohydrate employed in this system of infant feeding enjoys so rich and enduring a background of authoritative clinical experience as Dextri-Maltose.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons

Mead Johnson & Company, Evansville, Ind., U. S. A.

THEELIN

(ketohydroxyestratriene)

The introduction of Theelin to the medical profession by Parke, Davis & Company marked a new phase in endocrine therapy. Theelin was the first estrogen to be isolated in pure crystalline form, the first pure estrogen to be used clinically, the first to be reported in medical literature.

Theelin has been available, either experimentally or commercially, for nearly eight years. During that time it has made endocrine history with thousands of discriminating practitioners who have relied on it for supplementing or replacing deficient ovarian secretion in the control of menopausal symptoms.

THEELIN (AQUEOUS) · THEELIN IN OIL · THEELIN SUPPOSITORIES

KAPSEALS
THEELOL

(trihydroxyestratriene)

Theelol is likewise a chemically pure, naturally occurring estrogen, carefully standardized by physiological and chemical methods. It is closely related to Theelin, but more soluble in water.

Theelin for intramuscular use, and Theelol for oral administration, were isolated and identified both chemically and pharmacologically by Dr. E. A. Doisy of St. Louis University. The further development of these two preparations for clinical application was carried out through cooperative work on the part of the staffs of the Research Laboratory and the Department of Experimental Medicine of Parke, Davis & Company.

KAPSEALS THEELOL

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The World's Largest Makers of Pharmaceutical and Biological Products

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